Doing It All At Once: Multitasking as a predictor of call center agents' performance and performance-based dismissal

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Multitasking has become an important skill in many jobs. Still, the predictive validity of job-applicants' multitasking abilities has rarely been tested empirically. The current study focuses on the multitasking ability of call center applicants. Results from a Dutch call center show that applicants' multitasking ability as assessed during personnel selection indeed predicts their later job performance as call center agents as well as their likelihood of losing their job for poor performance. While some of these relationships could be explained via applicants' fluid intelligence, results also support the usefulness of including measures of multitasking ability in the current selection procedure.

1. Introduction

As new technologies emerge and jobs become more complex, good multitasking, that is, doing multiple tasks at once, has become important for good job performance (König, Bühner, & Murling, 2005). When employees lack multitasking abilities, it arguably becomes more difficult for them to meet the requirements of their jobs, increasing the risk of poor performance and of performance-based dismissal. This makes the identification of employees with adequate multitasking abilities early during the personnel selection process essential (Bühner, König, Pick, & Krumm, 2006).

Still, empirical research on multitasking is scarce and mostly laboratorial. Still scarcer are studies testing multitasking in the field, and very little is known about the predictive validity of multitasking as assessed during personnel selection for predicting employees' later performance or even their dismissal. The current study tries to fill this gap by testing how well candidates' multitasking ability, as assessed during personnel selection, predicts their performance on the job as well as their likelihood and time of performance-based dismissal.

1.1. Multitasking and job performance

With the introduction of new technologies like e-mail, instant messaging, customer relations management applications, and smart phones, people have to deal with multiple sources of information at once (König et al., 2005). On average, people spend about 3 min on a task and about 2 min using any electronic tool or paper document before switching to another task (Gonzalez & Mark, 2004). This raises the importance of multitasking, the ability to accomplish 'multiple task goals in the same general time period by engaging in frequent switches between individual tasks' (Delbridge, 2000, p. 1).

Even though several laboratory studies indicate that multitasking ability has strong implications for performance and the quality of work (Franklin & Hunt, 1993; Joslyn & Hunt, 1998; Kahneman, 1973; Meyer & Kieras, 1997; Wickens, 1980), multitasking has only recently become a topic in applied research. Little is known about the possibilities to predict regular job performance with tests of multitasking ability. Most studies on multitasking have been conducted by cognitive psychologists who focus on the cognitive processes that make multitasking possible (e.g., Logan & Gordon, 2001; Meyer & Kieras, 1997; Monsell, 2003; Pashler, 2000). Applied researchers have only looked at simple and rather abstract dual

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decision-making tasks (Joslyn & Hunt, 1998) (i.e., a task in which subjects make separate responses to two stimuli presented simultaneously or in rapid succession; Logan, 2002) as predictors of performance (Damos, 1993; Stankov, Fogarty, & Watt, 1989). As far as we know, multitasking ability has never before been tested using a more complex work sample test, presenting critical job situations taken from real life. The benefit of such a test is that multitasking behavior is measured more directly, while providing a preview of the job itself and showing good face validity. Appearing job-related and hence fair, such tests show positive applicant reactions (Steiner & Gilliland, 1996). At the same time, the predictive validity of work sample tests usually compares well even with cognitive ability tests (Schmidt & Hunter, 1998), but they suffer substantially less from adverse impacts for minority groups (Callinan & Robertson, 2000; Schmitt, Clause, & Pulakos, 1996).

A job for which multitasking is quite typical is the job of a call center agent. An agent is the person who handles incoming or outgoing customer calls within a call center (Braun, Hüttges, Timm, Wieland, & Willamowski, 2002; Bühner et al., 2006). The primary function for most call centers, also known as 'inbound' call centers, is to receive telephone calls initiated by customers. Inbound call centers typically spend 60–80% of their budget on staff members who handle phone calls (Aksin, Armony, & Mehrotra, 2007). Agents face both quantitative (calls per hour, average call times, time between calls, etc.) and qualitative (content, style, adherence to policies, etc.) demands (Bain, Watson, Mulvey, Taylor, & Gall, 2002), which may sometimes even conflict one another (Aksin et al., 2007).

The high pressure in the face of multitasking demands causes tension and more frequent mistakes (Franklin & Hunt, 1993; Joslyn & Hunt, 1998, Oswald, Hambrick, & Jones, 2007). However, laboratory studies have shown that some people do not show the typical performance decrement associated with multi-tasking conditions, but that they seem to thrive on the challenge (Rubinstein, Meyer, & Evans, 2001; Schumacher et al., 2001). If individuals thus differ in their multitasking ability, it might be possible to measure these differences during personnel selection and to use these measurements to predict performance in multitasking jobs.

Hypothesis 1: Call center applicants' multitasking ability as assessed during personnel selection will positively predict their subsequent performance as call center agents.

1.2. Multitasking and performance-based dismissal

Laboratory studies suggest that multitasking can influence performance (Franklin & Hunt, 1993; Joslyn & Hunt, 1998; Logan & Gordon, 2001). In the real world, however, this can also have serious consequences not only for organizations, but also for employees. Research among employees in many different occupations has shown that the lower an employee performs, the more likely this employee is to lose his or her job (Futrell & Parasuraman, 1984; Jackofsky, 1984; Martin, Price, & Mueller, 1981; McEvoy & Cascio, 1987; Wright & Bonett, 1997; Wright & Cropanzano, 1998). Yet, when it comes to predicting performance-based dismissal already during personnel selection, past research has only focused on motivational predictors. These predictors indicate a lack of employee reliability (e.g., Borofsky, 2000) and thus aim to identify employees who may be 'themselves at fault' for losing their jobs. Missing, however, is research on ability-related causes for dismissals. Such research is particularly important, as involuntary job loss fosters depression, poor health and impaired functioning (Price, Choi, & Vinokur, 2002). Being able to prevent employees from making the devastating experience of losing their job as they cannot keep up with the requirements of the job (e.g., Hobson et al., 1998) offers both a conceptual and practically relevant contribution. Particularly in call centers, performance-based dismissal is a big problem. The average annual turnover rate for call centers in the Netherlands (where this study was run) lies between 30 and 45% (Rennalds, 2008), surpassing the average annual turnover in other branches by about 150–300% (www.businneswise.nl). About a third of this turnover is caused by performance-based dismissals. The timely identification of applicants who will have difficulties with multitasking may thus provide both high financial utility for employers (Lebreton, Binnin, Adorno, & Melcher, 2004) and prevent devastating experiences for employees. Thus, we assume:

Hypothesis 2: Call center applicants' multitasking ability as assessed during personnel selection will positively predict call center agents' survival in the job, rather than being dismissed for poor performance.

1.3. Multitasking and fluid intelligence

To assess multitasking skills, it is important to know how multitasking works. While employees find it more difficult to perform well on multitasking jobs (Bogner, 1994; Cook & Woods, 1994; Proctor, Wang, & Pick, 1998; Wickens, 1980; Kahneman, 1973; Meyer & Kieras, 1997), several laboratory studies have shown that some people do not show the typical performance decrement associated with multi-tasking conditions (Rubinstein et al., 2001; Schumacher et al., 2001). A possible explanation for this may lie in differences in participants' cognitive processing (Brookings & Damos, 1991; Burgess, 2000; Ishizaka, Marshall, & Conte, 2001).

Research has established strong relationships between performance in multitasking paradigms and

performance in standard tests of general mental abilities, and more specifically, tests of fluid intelligence (e.g., König et al., 2005), the most fundamental part of cognitive abilities. Beside crystallized intelligence, that is, acquired knowledge, fluid intelligence addresses candidates' ability to reason and to solve novel problems. Fluid intelligence has previously been linked to multitasking abilities (e.g., König et al., 2005), as it arguably helped people to cope with the demands of multitasking compared with single tasks (König et al., 2005; Ben-Shakhar & Sheffer, 2001; Stankov, 1988). We chose to focus on fluid intelligence rather than general mental ability for the closer conceptual link between multitasking and fluid intelligence and assumed that multitasking test scores will likely correlate with the scores of a fluid intelligence test.[1]

Such correlation is important as cognitive abilities such as fluid intelligence present one of the best predictors of job performance that we know of (Schmidt & Hunter, 1998). Thus, the question emerges whether the proposed predictive validity of a multitasking test for job performance and performance-based dismissal may solely be a function of candidates' fluid cognitive abilities. If so, then an additional test of multitasking during personnel selection may be redundant. Alternatively, however, one might also argue that a work sample test of multitasking actually shows incremental validity over and above fluid intelligence, given that such multitasking test also benefits from a high content validity with the requirements of the job. Thus, we propose:

Hypothesis 3: Fluid intelligence will partially explain the relationship between applicants' multitasking ability as assessed during personnel selection and (a) their later job performance as well as (b) the likelihood of being dismissed for poor performance, yet multitasking will still (c) show incremental validity over and above fluid intelligence when predicting job performance.

To our knowledge, this is the first study to address the predictive validity of a multitasking test on actual job performance. It also is the first study to address the predictive validity of any ability-related selection tool on performance-based dismissal, testing the predicting validity of both fluid intelligence and multitasking.

2. Method

2.1. Sample

We used data from 267 applicants (mean age = 27.91 years; standard deviation [*SD*] = 8.40; 51.4% female) who applied between 2008 and 2010 for a call center agent job at the customer service call center of a Dutch utility company. Applicants had undergone a junior secondary vocational education (7.5%), an intermediate vocational training (61.4%), a bachelor's degree (25.1%), or a master's degree (6%). To predict job performance, data on the job performance of 183 call center agents was collected from October 2010 till March 2011. From this sample, 23 participants had started their job less than 2 months before the evaluation (13 participants), thus still undergoing the familiarization period, or were only evaluated once, twice or three times on the job (10 participants). As the average number of evaluations is 26 (*SD* = 15.67), we saw three evaluations or fewer as not giving a representative view of an agents' performance, leaving a total of 160 participants of comparable demographics as in the overall sample.

2.2. Measures

Multitasking was measured during the personnel selection process with the 'Meurs Call Center Test', a Dutch multitasking work sample test that relies on the definition of multitasking as 'the performance achieved when simultaneously dealing with routine tasks and tasks demanding cognitive performances (problem solving)' (Bratfisch & Hagman, 2003). It measures multitasking ability in an applied way specifically designed to fit the quantitative and qualitative demands of a call center agent's job (e.g., Aksin et al., 2007; Bain et al., 2002) by stetting a challenging time limit and asking for quantitative and qualitative answers to questions similar to the questions that agents encounter on the job. The test consists of five exercises and one practice exercise, each containing between 13 and 17 questions. Each exercise contains a voice message from a hypothetical customer, providing information the candidate has to fill in to an information form within the set time limit. Additionally, the candidate can click on different links to open extra information screens in order to look up missing information not mentioned in the voice message. The candidate has to look up information, listen to the voice message, and read and type all at the same time. This is where the candidate needs multitasking skills as he or she deals with routine tasks (typing, listening) and tasks demanding cognitive performances (analyzing information, deciding what strategy to use, etc.) simultaneously. The total multitasking test score counts how many questions a candidate answered correctly throughout the whole test ($\alpha = .92$).

Fluid intelligence was assessed via the relevant subscales of the Meurs Capaciteiten Midden TPI Battery (CapMtpi). The CapMtip is a classic multifaceted measure of cognitive abilities, including three subtests designed to address candidates' fluid intelligence (Meurs HRM Commissie Testaangelegenheden Nederland [COTAN] report, 1996); a classifying subtest (finding one out of four words that does not fit in), a diagrams subtest (choosing one of four possible diagrams that best represents the relationship between three words), and a figure series subtest (choosing one of four

possible figures that follows logically from the pattern underlying a series of four other figures). The CapMtpi ($\alpha = .88$) has undergone official validation and accreditation by the COTAN, the official body in charge of evaluating psychological tests and of providing information for test users in the Netherlands.

Job performance was measured by the Customer Operations Performance Center (COPC) method, a widely accepted standard for customer service providers developed on best practices from more than 200 international call centers (COPC-2000 VMO Standard, 1996–2007) and also used in the current call center. According to the COPC, supervisors collect data on two key performance indicators: 'customer critical' and 'business critical'. Customer critical addresses the degree to which agents answered customers questions correctly and execute the actions promised to the customer. Business critical addresses the degree to which agents act on sales opportunities. Listening in on conversations between agents and customers, supervisors give agents a performance score of 0% (critical) or 100% (good) for each call. The total score is the average score for all different behavioral components. Supervisors were blind to call center agents' performance during the selection procedure, thus ensuring that selection and job performance ratings are assessed independently from one another.

2.3. Performance-based dismissal

The call center's human resource departments provided information on when agents started their job, when they left their job and the reason why they left. This information is available until the end of 2010.

3. Results

See Table 1 for the descriptive statistics and intercorrelations among study variables.

3.1. Predicting job performance

A multiple regression (Table 2) confirmed Hypothesis 1 that applicants' multitasking ability assessed during personnel selection would predict their performance as call

Table 1. Descriptive statistics and correlations

		Descriptive statistics		Correlations				
		M	*SD*	1	2	3	4	5
1	Multitasking total score	.40	.79					
	N			267				
2	Fluid Intelligence	.44	.71	.44**				
	N			267	267			
3	Customer critical	.92%	.08%	.21**	.26**			
	N			160	160	160		
4	Business critical	.95%	.06%	.10	.00	.58**		
	N			160	160	160	160	
5	Performance-based dismissal	.71%		.33**	.21*	.18	.03	
	N			150	150	38	38	150

* $p < .05$, ** $p < .01$. *SD* = standard deviation.

Table 2. Linear regression analysis on performance indicators

Test score	Costumer critical				Business critical			
	B	*SE B*	β	R^2 change	*B*	*SE B*	β	R^2 change
Model 1				.05**				.01
Constant	.87	.03			.93	.02		
Multitasking	.00	.00	.21**		.00	.00	.10	
Model 2				.06**				.00
Constant	.93	.01			.95	.01		
Fluid intelligence	.02	.01	.25**		.00	.01	.06	
Model 3				To Model 1: .03*				To Model 1: .00
				To Model 2: .01				To Model 2: .01
Constant	.89	.03			.93	.02		
Fluid intelligence	.02	.01	.20*		.00	.02	.02	
Multitasking	.00	.00	.13		.00	.00	.09	
95% CI indirect effect		.0001–.0012*				–.0004–.0005		

* $p < .05$, ** $p < .01$, bootstrapping based on 5000 samples. *SE* = standard error.

Table 3. Cox regression analyses of multitasking ability and fluid intelligence on call center agents' performance-based dismissals

Model	Covariate	*B*	*SE*	*df*	*p*	Odds ratio	95% Lower level	95% Upper level	ΔP^2
1	Multitasking	−.04	.01	1	.00	.96	.94	.98	.07**
2	Fluid intelligence	−.29	.15	1	.06	.75	.56	1.01	.02
3	Multitasking	−.04	.01	1	.00	.96	.94	.98	To Model 2: .05**
	Fluid intelligence	−.08	.16	1	.62	.92	.67	1.27	To Model 1: .00

* $p < 0.05$. ** $p < 0.01$. *SE* = standard error; *df* = degrees of freedom.

center agents, at least on the criterion 'customer critical' ($r = .21$, $p < .01$), not, however, on the criterion 'business critical' (i.e., acting on sales opportunities).

3.2. Predicting dismissal

In line with Hypothesis 2, a Cox regression survival analysis found that applicants' multitasking ability during personnel selection negatively predicted their likelihood and time of performance-based dismissal as call center agents ($R^2 = .07$ with a 99% confidence interval from .01 to .19 (Steiger & Fouladi, 1992); Table 3).

3.3. Differentiating effects of multitasking ability and of fluid intelligence

A set of multiple linear regression analyses (Table 2) addressed the incremental effect of multitasking ability on performance after controlling for fluid intelligence, as well as the possibility that fluid intelligence accounted for the relationship between multitasking ability and performance. The latter was also tested with a bootstrapping procedure to estimate the 95% confidence interval around the indirect effect (Preacher & Hayes, 2008). Multitasking ability had no incremental validity beyond fluid intelligence on call center agents' job performance, but fluid intelligence and multitasking ability together made a better prediction of job performance (customer critical) than multitasking alone (R^2change = .03, $p < .05$). Further, results suggest that agents' fluid intelligence accounted for the predictive validity of agents' multitasking on their later customer-critical job performance. Multitasking was no longer a significant predictor as soon as fluid intelligence was entered in the analysis. Also, bootstrapping analyses showed that the indirect relationship between multitasking and performance via fluid intelligence was significant (i.e., the 95% confidence interval did not include the zero). No significant results were found for agents' performance on the business critical.

Results were different for the prediction of performance-based dismissal (Table 3). Here, candidates' multitasking abilities showed incremental validity over and above their fluid intelligence, and fluid intelligence was unable to account for the significant link between candidates' multitasking abilities as assessed during the personnel selection and their time and likelihood of losing their jobs due to poor performance.

4. Discussion

In summary, results show that multitasking ability can predict job performance related to customer contact, but not to noticing business opportunities. Multitasking ability can also predict performance-based dismissal. Fluid intelligence can explain the predictive relationship between multitasking ability and job performance, but it can not fully explain the predictive relationship between multitasking ability and performance-based dismissal.

4.1. Contributions and implications

This study makes three major contributions: (1) it extends earlier laboratory work by testing the predictive validity of multitasking ability in real-life settings. This not only provides evidence that basic laboratory findings generalize to the field, but is also of practical relevance in establishing that multitasking ability is a useful method for selection applicants – and quite likely also a face-valid and socially acceptable method. (2) Including both employee performance and performance-based dismissal as dependent variables, this study included outcomes relevant to both organizations interested in enhancing their selection procedure's utility and to employees interested in preventing an involuntary job loss. And (3) the study addresses the role of candidates' fluid intelligence, showing that fluid intelligence indeed played a major and incremental role in the prediction of customer related job performance, not, however, in the decision to dismiss employees due to poor performance.

Given the finding that some of the criterion-related validity of the multitasking test could be explained via fluid intelligence, the question arises whether one should even use multitasking as a predictor during selection, or whether it would be better to rely on a classic assessment of general mental ability only. Longstanding problems with cognitive ability tests are that they have adverse impacts (Hunter & Hunter, 1984) and

less-favorable applicant reactions (Anderson, Salgado, & Hülsheger, 2010). Little is known about how a multitasking test like the current one would score on these two criteria. Yet, because a frequent recommendation to forgo both adverse impact and negative applicant reactions is to raise the fidelity of the assessment tool (Lievens & Patterson, 2011), the current results suggest that it may be possible to include multitasking ability into a selection battery that may thus combine economic sensibilities with concerns for social validity (Klehe, 2004).

4.2. Limitations and directions for future directions

As not all applicants tested on their multitasking abilities were selected for the job, our estimates of the test's predictive validity for both performance and dismissal are rather conservative (e.g., a correction of range restriction increases the predictive validity of multitasking for customer critical performance from $\beta = .21$ to $\beta = .67$; Cohen, Cohen, West, & Aiken, 2003). Also, the setting made us rely on the COPC as the industry standard to assess call center agents' job performance (COPC-2000 VMO Standard, 1996–2007). Still, to reduce scale coarseness (Aguinis, Pierce, & Culpepper, 2008), a more refined and multidimensional assessment would have been better – and would likely have again increased the found effects.

Future research is necessary to study the generalizability of results across countries and languages and to other jobs where multitasking may be a less obvious requirement and also to compare both candidates' reactions and the adverse impact of multitasking work samples with those of more classic predictors of job performance. Moreover, we found multitasking ability to predict basic customer-critical performance, but not business-critical performance, likely because the multitasking test employed addresses candidates' ability to handle and react to multiple requirements at once. It does not address, however, candidates' proactive search for new business opportunities at the same time. In the future, it might be possible to predict this business-critical performance by extending or combining the multitasking test with personality measures addressing call center agent's level of proactivity. Also, the process by which ability, as assessed via candidates' multitasking ability, may interact with other abilities such as emotional skills or how it might interact or even predict candidates' motivation once they are on the job would be relevant avenues for future research.

Finally, the prediction of performance-based dismissal with ability-related measures during personnel selection is new and needs further attention across different types of samples. Given that poor multitasking ability as a predictor points at a lack of ability, rather than motivation, to cause employees' later job loss, such tests may prove highly useful in sparing candidates such traumatic life event (Hobson et al., 1998; Price et al., 2002).

5. Conclusion

In sum, the current study shows that the ability to multitask has a positive influence on job performance and predicts performance-based dismissal in call centers. Fluid intelligence is able to explain the predictive validity of multitasking ability toward job performance, but not toward performance-based dismissal. The multitasking ability test is therefore a valuable instrument that can be used during personnel selection. It can contribute to the prevention of performance-based dismissal by selecting those candidates who are likely to thrive in high-pressure working environments and who can handle situations in which they need multitasking ability. The results of this study call for efforts to also include tests of job-specific abilities, such as multitasking tests (if multitasking is relevant for the job) for predicting job performance. And finally, they show how such ability measures can be used to spare applicants the devastating experience of losing their jobs because of poor performance.

Note

1. That said, we also ran analyses with a complete test of cognitive abilities, combining measures of both fluid and crystallized intelligence. Results showed no meaningful differences to the ones described in the article, but are available from the first or second authors upon request.

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