Commentary

Psychological Science
24(5) 809–810

DOI: 10.1177/0956797612465199
pss.sagepub.com

Gender Invariance in Multitasking: A Comment on Mäntylä (2013)

David L. Strayer[1], Nathan Medeiros-Ward[1], and Jason M. Watson[1,2]
[1]Department of Psychology and [2]Brain Institute, University of Utah

Received 8/14/12; Accepted 9/19/12

Mäntylä (2013) compared men and women who concurrently performed a counter-monitoring task and an *n*-back task and concluded that gender differences in multitasking reflect spatial ability. Here, we suggest (a) that there are no gender differences in a ubiquitous real-world version of multitasking (i.e., talking on a cell phone while driving), (b) that the data reported by Mäntylä do not, in fact, provide clear and unambiguous evidence for gender differences in multitasking, and (c) that individual differences in the ability to multitask are more likely associated with executive attention.

First, in previous work, we (Watson & Strayer, 2010) examined individual differences in the ability to concurrently operate a motor vehicle and talk on a cell phone, a multitasking activity engaged in by the majority of drivers on the roadway (AAA Foundation for Traffic Safety, 2011). Because driving involves spatial processing for route navigation and lane maintenance, it seems reasonable to look for gender differences in multitasking in this context. Table 1 presents difference scores for dual-task minus single-task performance in our 2010 study, separated by gender. It is important to note that there are no gender differences in multitasking ability (all $ps > .5$). Further, Bayes factor tests of the null hypothesis provided strong evidence for an invariance in multitasking ability for men and women (see also Rouder, Speckman, Sun, & Morey, 2009). This establishes that gender differences in multitasking in real-world tasks such as driving, in which men and women have similar levels of prior experience, are not the norm. The absence of gender differences raises questions about the generality of gender-based differences in multitasking and, more specifically, casts doubt on the claim that gender-based differences should be found in multitasking contexts in which spatial processing is involved.

Second, Mäntylä (2013) reported (a) that there were gender differences favoring males in both multitasking and baseline spatial ability and (b) that measures of both spatial ability and executive function were independent predictors of ability to multitask. Further analysis conducted by the author revealed that these gender differences in multitasking were fully mediated by spatial ability. Therefore, when controlling for unwanted spatial confounds in the multitasking environment (e.g., using a covariance-based approach), even the data analysis reported by Mäntylä does not provide unequivocal evidence for gender differences in multitasking. There may be instances in which spatial ability is important for multitasking; however, there is scant evidence to suggest that spatial ability is a general property of multitasking. Hence, once again, there is not sufficient empirical support to justify the strong claim that men and women differ in their ability to multitask.

Third, in the modern world, multitasking is commonplace and often comes with unfortunate consequences, given that it increases the likelihood of cognitive distraction (e.g., see Strayer, Watson, & Drews, 2011). Undoubtedly, some people are better at multitasking than others, and it is theoretically important to understand what mechanisms underlie these individual differences in performance (Watson & Strayer, 2010). Moreover, multitasking is a highly relevant topic, given the increased societal pressures to multitask that have accompanied recent advances in technology. The fact that gender is not a good predictor of multitasking ability necessarily begs the question of what is. We suggest that a more productive approach in this research domain is to consider the association between individual differences in executive attention and the ability to multitask. Executive attention—which, for our purposes, can be defined as the ability to maintain task goals and to avoid cognitive distraction (Engle, 2002)—predicts performance on a wide range of laboratory and real-world tasks.

Corresponding Author:
David L. Strayer, Department of Psychology, University of Utah, 380 S. 1530 E, No. 502, Salt Lake City, UT 84112
E-mail: david.strayer@utah.edu

Table 1. Mean Difference Scores for Dual- Versus Single-Task Performance in the Driving and Operation Span Tasks in Watson and Strayer (2010)

Task and measure of performance	Males (n = 91)	Females (n = 109)	Bayes factor[a]
Driving task			
Braking response time (ms)	211 (44)	212 (41)	9.0
Following distance (m)	–8.3 (4.0)	–8.4 (3.6)	9.0
Operation span task			
Math	1.9 (0.5)	1.6 (0.4)	7.7
Memory	5.3 (0.9)	4.7 (0.8)	8.2

Note: Standard deviations are shown in parentheses.
[a]This column shows scaled Jeffreys-Zellner-Siow factor scores (expressed as the odds ratio of the null to the alternative hypothesis; Rouder, Speckman, Sun, & Morey, 2009).

Consistent with this argument, the data reported by Mäntylä (2013) do support the hypothesis that individual differences in aspects of executive function predict multitasking ability. Furthermore, Mäntylä also cited related work by Hambrick, Oswald, Darowski, Rench, and Brou (2010), who "could not find a single scientific report" in support of gender differences in multitasking (p. 1164). However, Hambrick et al. did report (a) a significant relationship between individual differences in measures of executive attention (measured using complex span tasks) and multitasking ability and (b) significant gender differences in multitasking; importantly, the authors conducted additional analyses akin to what we have described here that revealed the male advantage in multitasking to be mediated by men's greater prior experience in playing video games.

It is also noteworthy that normative data collected on more than 6,000 participants reported by Redick et al. (2012) revealed "extremely small or no gender effects" (p. 169) on such complex span tasks (including a version of the operation span task; see Table 1), which are thought to measure executive attention. Hence, this null effect of gender on executive attention, whereby the latter appears to play a significant role in predicting multitasking, may help explain the apparent lack of gender differences in multitasking in the larger literature. In fact, to this end, we cannot think of a good a priori theoretical reason to argue that men and women should differ in their baseline executive-attention ability to maintain task goals and to avoid cognitive distraction.

In conclusion, Mäntylä's (2013) report of gender differences in multitasking ought to be taken with caution. The weight of the empirical evidence overwhelmingly suggests gender invariance in multitasking, with individual differences in executive attention most likely underlying the ability to multitask (Strayer & Watson, 2012).

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

References

AAA Foundation for Traffic Safety. (2011). *Traffic safety culture index*. Retrieved from https://www.aaafoundation.org/sites/default/files/2011TSCI.pdf

Engle, R. W. (2002). Working memory capacity as executive attention. *Current Directions in Psychological Science*, *11*, 19–23.

Hambrick, D. Z., Oswald, F. L., Darowski, E. S., Rench, T. A., & Brou, R. (2010). Predictors of multitasking performance in a synthetic work paradigm. *Applied Cognitive Psychology*, *24*, 1149–1167.

Mäntylä, T. (2013). Gender differences in multitasking reflect spatial ability. *Psychological Science*, *24*, 514–520.

Redick, T. S., Broadway, J. M., Meier, M. E., Kuriakose, P. S., Unsworth, N., Kane, M. J., & Engle, R. W. (2012). Measuring working memory capacity with automated complex span tasks. *European Journal of Psychological Assessment*, *28*, 164–171.

Rouder, J. N., Speckman, P. L., Sun, D., & Morey, R. D. (2009). Bayesian *t* tests for accepting and rejecting the null hypothesis. *Psychonomic Bulletin & Review*, *16*, 225–237.

Strayer, D. L., & Watson, J. M. (2012, March/April). Supertaskers and the multitasking brain. *Scientific American Mind*, pp. 22–29.

Strayer, D. L., Watson, J. M., & Drews, F. A. (2011). Cognitive distraction while multitasking in the automobile. In B. Ross (Ed.), *The psychology of learning and motivation* (Vol. 54, pp. 29–58). San Diego, CA: Academic Press.

Watson, J. M., & Strayer, D. L. (2010). Supertaskers: Profiles in extraordinary multitasking ability. *Psychonomic Bulletin & Review*, *17*, 479–485.