

# Myers-Briggs® type and working virtually

## Impacts on work setting arrangement and training and development preferences

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### Introduction

Virtual work is the current term for working from home or other remote location, in contrast to traditional work, which here refers to working at an assigned location within an office or other employer-owned facility. It has gone by a number of other names over the years, including remote work, telework, distributed work, and the like. In addition, it takes a number of different forms, including working fully virtually, working virtually some portion of the time – typically one or two days per week – and working virtually or in a mobile manner within one’s normal work location – here, typically an office setting. However, it has been unclear how common each of these different approaches to virtual work actually is.

In addition, while some research has been conducted on the factors that determine who typically works virtually, few studies have examined individual difference variables in relation to virtual work (cf., Hackston & Moyle, 2007; Schaubhut, Thompson, & O’Hara, 2008). This paper provides data from three studies to provide an overview of virtual work and the role of personality type, as measured by the Myers-Briggs Type Indicator® (MBTI®) assessment, on several aspects of virtual work. Specifically, that would include the frequency with which people of different personality types report working virtually, as well as personality-related perceptions of such work and how personality type differences impact virtual training and development preferences.

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## Who works virtually

Finding a clear estimate of who works from home or from some other remote location, and how often, is surprisingly difficult given the frequency with which this topic is discussed in the academic literature and popular press. One estimate based on data from the American Community Survey (ACS) administered by the US Census Bureau draws on an item that asks respondents how they commute to work, for which “work at home” is an option. These data, summarized by GlobalWorkPlaceAnalytics.com (2016), suggest that of individuals who are not self-employed, 2.8% of the workforce now reports working from home at least half the time, a figure that has grown by 103% since 2005. Other studies have cited statistics about employers offering such work setting arrangements (Matos & Galinsky, 2012), or the impacts of such arrangements (Shockley, 2014), but no other studies found include current, definitive estimates of the percentage of individuals working virtually. Therefore, this paper will draw on a sample from The Myers-Briggs Company’s archive of individuals who have completed the MBTI assessment in order to provide an estimate.

### Individual differences in virtual work

Shockley (2014) indicates that at the time of her writing, she found over 50 empirical studies that examined some aspect of virtual work. However, a majority of these studies focused on outcomes of such work, or the role of technology in virtual work and virtual teams. Some of these studies suggest that individual differences might play a role in the outcomes examined. For example, in a review of the literature Gera et al. (2013) suggest that virtual and face-to-face teams report differences in how they function. Specifically, virtual teams use less effective modes of handling conflict; report lower levels of satisfaction, trust, and cohesion; and do not perform as well as face-to-face teams. It is apparent that an understanding of individual differences in a virtual context could play a role in addressing these challenges. To be clear, virtual teams also have a number of reported benefits. Shockley (2014), for example, in a similar summary reports

that virtual workers (telecommuters) report higher levels of perception of autonomy, flexibility, and job satisfaction; higher supervisor ratings of performance; higher-quality supervisor relationships; and lower levels of work role stress.

Our review of the academic literature found few studies of individual differences that can help us understand who works virtually, or how individual differences impact important organizational outcomes of virtual work. One study (Shockley & Allen, 2010) examined the need for affiliation at work, segmentation of work and life, and occupational achievement on employees’ choices regarding virtual work (telework). In a second study, focused on virtual teams, Luse, McElroy, Townsend, and DeMarie (2013) report that the MBTI Form M assessment, used in their study as a measure of cognitive style, predicted individuals’ desire to work in a virtual team over working alone, and when combined with five-factor model (FFM) measures, the T–F and J–P preference pairs remained significant predictors. When examining individuals’ preference for virtual teams over face-to-face teams, the E–I preference pair was again predictive, and when combined with FFM measures, E–I remained a significant predictor, along with the FFM measure Openness.

The paucity of research on individual differences and virtual work is addressed here as it extends the examination of individual differences in virtual work by incorporating personality type as measured by the MBTI assessment. Specifically, two studies are reported that examine personality type and virtual work. The first uses an archival database to examine which personality types are more likely to report working virtually. The second uses a convenience sample to examine preferences regarding work as well as training and development preferences. A third study compares the outcomes of virtual versus in-person training outcomes of an introductory MBTI assessment workshop.

## Study 1: Analysis of MBTI® type and virtual work based on the MBTI® archive sample

Although the general belief is that virtual work is increasing, only a small amount of quality data on the size of the trend is available. Study 1 was conducted to examine, in a large sample of convenience, workplace trends regarding virtual work, along with personality type derived from the MBTI Form M assessment. The study is chiefly intended to be informative, as the sample was not a randomly drawn representative sample. However, given the size of the sample, and its consistency with US workforce demographics, it is likely a very accurate description of the virtual work trend in general, and MBTI type and virtual work trends in particular.

### Data collected

Study 1 centers on data from a The Myers-Briggs Company commercial archive of all individuals who completed the MBTI Form M assessment between 2012 and early 2015. The archive sample used in this study comprises 608,471 respondents drawn from The Myers-Briggs Company's larger MBTI archive of over 5 million individuals who responded to an item that asked how often they worked virtually. Specifically, the item asked respondents to indicate the "percentage of time spent working in a remote or home office" on a 10-point scale, anchored from 0–10% (1) to 90–100% (10). The archive sample was composed of 51% women and 47% men, with 2% not responding; the average age was 38.6 years (SD = 11.5). Ninety-nine percent of the sample reported working full- or part-time, and the most commonly reported occupations included management and business and financial operations, both approximately 18% of the sample. While the sample was not drawn exclusively from the United States, about 80% of the respondents indicated the United States as their country of residence.

Comparisons were made between the archive sample characteristics and the US Bureau of Labor Statistics (BLS) workforce sample characteristics (2015). The

BLS indicates that in 2014, the gender distribution of the workforce in the United States was about 52% women and 48% men; while the ethnic distribution was about 79% white, 16% Hispanic, 12% black, and 6% Asian, with the remaining percentage reporting multiple or other ethnic memberships. (Note: The total percentage there exceeds 100 due to the way Hispanic or Latino ethnicity is measured in US government surveys.) The archive sample is very similar to the 2014 estimates of the US workforce, as summarized in table 1.

**Table 1 | Comparison of MBTI® archive and BLS workforce (2014) sample characteristics**

Demographic	MBTI® archive sample (N = 608,471)	BLS workforce sample (N = 148,834)
<b>Gender</b>	%	%
Women	49	52
Men	51	48
<b>Ethnicity</b>		
White	69	9
Hispanic	8	16
Black	9	12
Asian	8	6
Other	6	3

### Virtual work in The Myers-Briggs Company's MBTI® archive sample

Using the single item about working from a remote or home office, the sample distribution of self-reported frequency of virtual work is summarized in figure 1 by MBTI type and overall. The figure shows that a vast majority of the sample (nearly 66%) work virtually only 0–10% of the time. When examining the item based on MBTI type, variation occurs in the distribution, with 73.1% of individuals reporting preferences for ISFP, and 59.6% for ENTJs, indicating they work virtually 0–10% of the time. Conversely, only 5.5% of the overall sample indicated they work virtually 91–100%

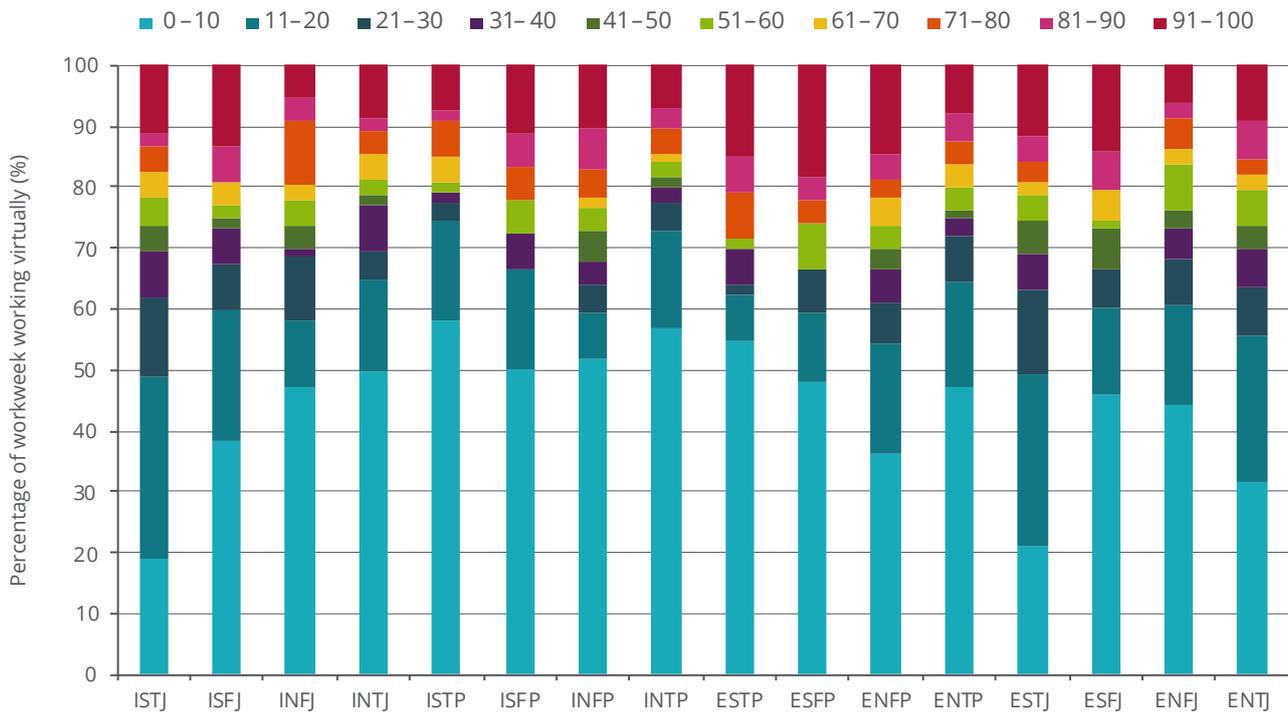


Figure 1 | Frequency of MBTI® types reporting working virtually in the MBTI® archive sample

Note: N = 608,471.

of the time. Again, some differences based on type occur. Specifically, 6.6% of ESFJs, and 4.6% of INFJs, indicated they work virtually 91–100% of the time. While this is a small absolute difference, it is a relative difference of about 30%.

Type-based differences are often easier to observe when examining the preference pairs rather than whole type. The preference pair distributions of the sample on the working from home or other remote location item are summarized in figure 2.

The figure shows that among all types, individuals with I, S, F, and P preferences responded most often that they work virtually 10% of the time or less. Put another way, those with ISFP preferences are most likely, perhaps surprisingly, to report working in a traditional fashion. The figure also shows that those with preferences for E, S, F, and J are most likely to report spending 91–100% of their time working virtually, but they still comprise a small portion of the overall archive sample.

### Study 1 Conclusions

The analysis of The Myers-Briggs Company's MBTI archive sample was largely exploratory, with no specific hypotheses being tested. While the popular press and academic researchers have taken an interest in the virtual work phenomenon, the results found here suggest that the trend toward working exclusively in a virtual manner is perhaps not as large as one might believe, but working virtually does impact to some degree a large proportion of the workforce, with nearly one-third of the sample indicating they work remotely 11% of the time or more. Nevertheless, the proportion of the sample spending one-half or more of their work time virtually is only 11.5%. Yet, this is about three times more than the estimate of 2.8% from GlobalWorkPlaceAnalytics.com (2016).

And study 1, along with prior research on MBTI type and work environment and preferences, leads to additional questions about virtual workers in

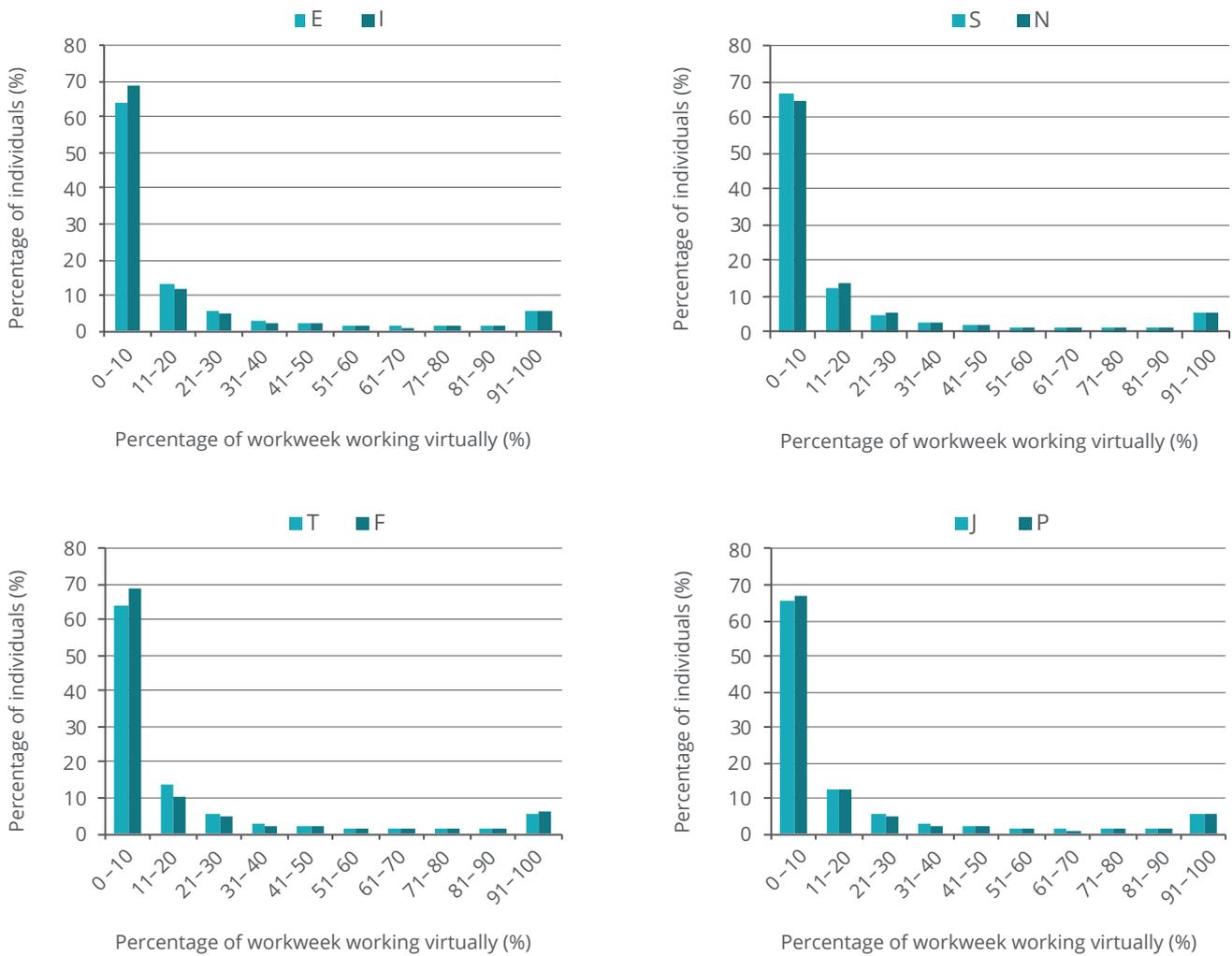


Figure 2 | Frequency of individuals reporting working virtually by MBTI® preference in the MBTI® archive sample

Note: N = 608,471.

general, along with more specific questions regarding how MBTI type might play a role in determining a preference for either traditional or virtual work. As a result, a second study was developed to provide additional insights.

### Study 2: MBTI® type and the virtual work survey

To gain a better understanding of how MBTI type might play a role in different work setting

arrangements, a second study was conducted. The study utilized the Virtual Work Survey, developed by the The Myers-Briggs Company Research Team, regarding the role of type in individuals' preference for virtual work and virtual training and development to address the following questions:

- Does MBTI type play a role in determining who chooses to work virtually or in a more traditional fashion?
- Does MBTI type impact the kinds of work people do or where they choose to perform their work?

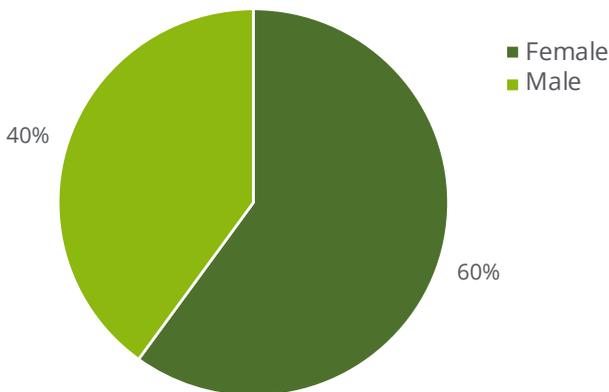
- Does MBTI type impact perceptions of the effectiveness of virtual work?
- Does MBTI type impact the choices people make regarding virtual or in-person training and development options?

The researchers then randomly selected individuals from the MBTI archive used in study 1 to be invited to participate in study 2. Descriptions of the sample and survey follow.

### Development of the virtual work survey sample

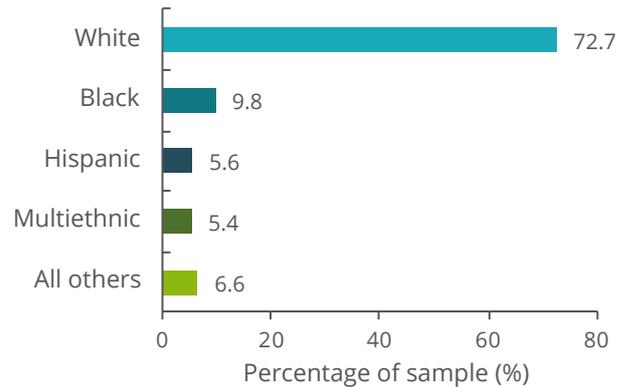
Starting with The Myers-Briggs Company's MBTI archive discussed in study 1, a sample was drawn consisting of individuals who had indicated they would be willing to participate in future research with The Myers-Briggs Company at the time they completed the MBTI Form M assessment.

The sample was stratified based on reported type and the prior response to the item regarding virtual work presented in study 1: "Percentage of time spent working in a remote or home office." The stratification was intended to obtain an approximately equal number of individuals for each of the 16 types, and to include approximately one-third of the sample



**Figure 3** | Ethnic distribution of the virtual work survey sample

Note: N = 1,622.



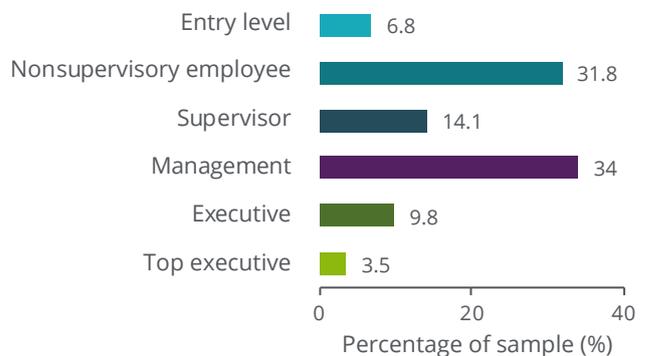
**Figure 4** | Ethnic distribution of the virtual work survey sample

Note: N = 1,622.

who worked in a traditional environment, one-third who worked virtually 11– 50% of the time, and one-third who worked virtually 51% of the time or more. Invitations to participate were sent and data for the survey were collected online. As an incentive, those who completed the survey were offered a copy of this paper in exchange for their participation.

### Demographic characteristics of the virtual work survey sample

The demographic characteristics of the survey sample are summarized in figures 3–6. Several criteria were applied to the Virtual Work Survey sample obtained (n = 2,236) to derive the final sample used for the



**Figure 5** | Organizational level distribution of the virtual work survey sample

Note: N = 1,622.

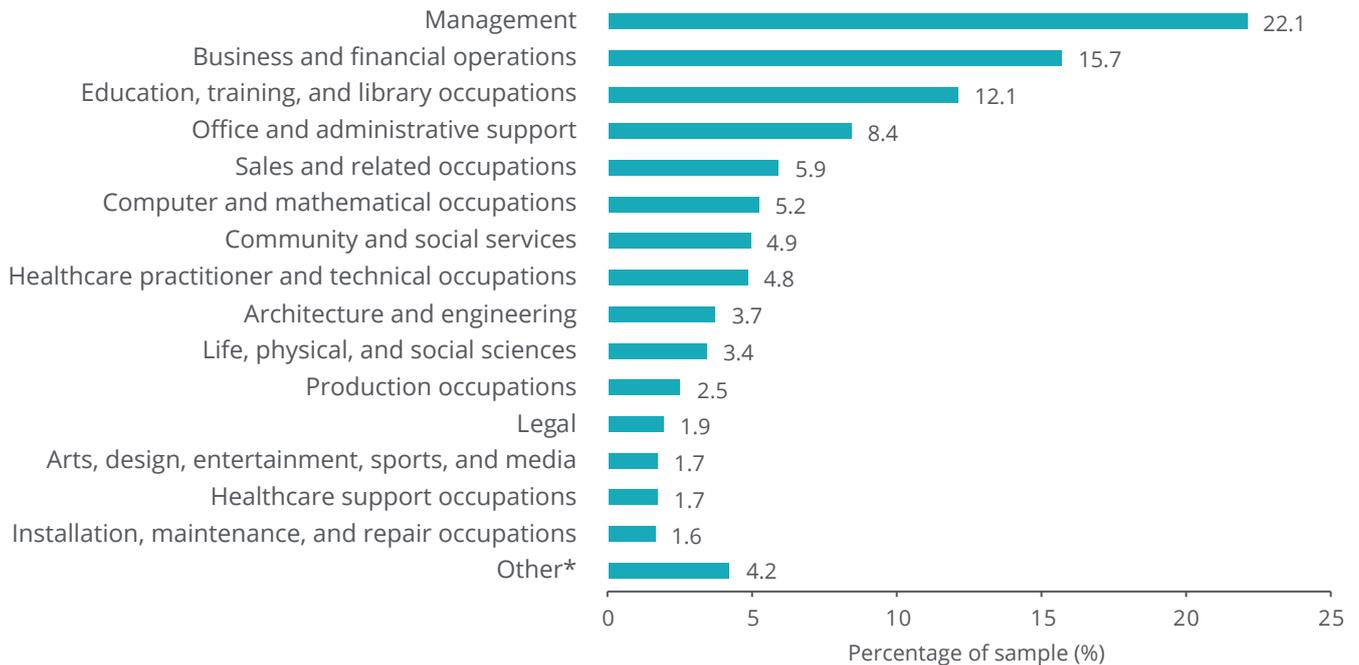
study 2 analyses. First, respondents had to know their MBTI type and be at least somewhat confident that it was a good fit for them. Second, they had to be employed full- or part-time. As a result, the final sample used for the analyses reported was reduced to 1,622 individuals. The average age of the individuals in the Virtual Work Survey sample was 41 years (SD = 10.5). Their MBTI types are summarized, along with a comparison with the Form M US general representative sample (GRS) in table 2 and again graphically in figure 7. The table also shows the self-selection ratios (SSRs), which are an indication of the over- or underrepresentation of each of the whole types in the survey sample.

**Table 2 | MBTI® type distribution of the virtual work survey sample and MBTI® Form M US General Representative Sample (GRS)**

Sample	% of sample by MBTI® type			
	ISTJ	ISFJ	INFJ	INTJ
Virtual work survey sample	12.9	0.9	4.7	11.7
MBTI Form M US GRS	11.6	12.9	1.5	2.1
SSR	0.9	4.3	0.3	0.2
Sample	% of sample by MBTI® type			
	ISTP	ISFP	INFP	INTP
Virtual work survey sample	4.1	1.3	6.5	7.7
MBTI Form M US GRS	5.4	4.1	4.4	3.3
SSR	1.3	8.0	0.7	0.4
Sample	% of sample by MBTI® type			
	ESTP	ESFP	ENFP	ENTP
Virtual work survey sample	3.2	1.3	7.9	6.4
MBTI Form M US GRS	4.3	3.2	8.1	3.2
SSR	1.3	5.0	1.0	0.5
Sample	% of sample by MBTI® type			
	ESTJ	ESFJ	ENFJ	ENTJ
Virtual work survey sample	10.1	0.9	4.8	10.2
MBTI Form M US GRS	8.7	10.1	2.5	1.8
SSR	0.9	3.2	0.5	0.2

Note: Virtual Work Survey sample, N = 1,622; MBTI Form M US GRS, N = 3,009.

The table and figure show that individuals with preferences for ESFP and ISFP are among the most underrepresented in the sample, while those with preferences for INTJ and ENTJ are among the most overrepresented in the sample. Although an attempt was made to obtain approximately equal numbers of respondents reporting each of the MBTI types, the data show that the targets were missed. There were insufficient ISFPs in the original outreach, and their numbers are very low in the survey sample, with only 20 included. The number of individuals with preferences for ESFP was also much smaller than desired, with only 32 included. On the other hand,



**Figure 6** | Occupational distribution of the virtual work survey sample

Note: N = 1,622. \*Other includes military-specific occupations; transportation and materials moving; protective services; personal care and personal service; farming, fishing, and forestry; construction and extraction—each 1% or less of the overall sample.

ISTJs closely matched the Form M US GRS, as did ESTJs.

### Survey description

The survey developed by the The Myers-Briggs Company research team addressed a number of questions regarding the perceptions of employed adults. It asked respondents to indicate their verified, or “best-fit,” type, along with their degree of confidence that it was indeed the best fit for them. In addition, a series of items focused on different areas of interest to the researchers intended to address the research questions identified. Each of these areas of interest is discussed below.

### Virtual work items

Seven items were used to measure the respondents’ virtual work preferences.

In addition to the virtual work item associated with study 1, “Percentage of time spent working in a

remote or home office,” respondents from the archive sample were asked on the Virtual Work Survey additional items regarding virtual work.

Using a five-point Likert-type response scale ranging from 1 = never to 5 = always, the survey asked workers as part of their normal job duties how frequently they

- Work remotely (off-site from a central office location)
- Interact with co-workers face-to-face
- Interact with co-workers virtually (i.e., using telecommunications and information technologies)
- Interact with outside parties (non-co-workers) face-to-face
- Interact with outside parties (non-co-workers) virtually

Respondents were then asked to identify as either a traditional worker, a virtual worker, or a third category, mobile worker – defined as an individual working outside the home office (such as in a Wi-Fi café)

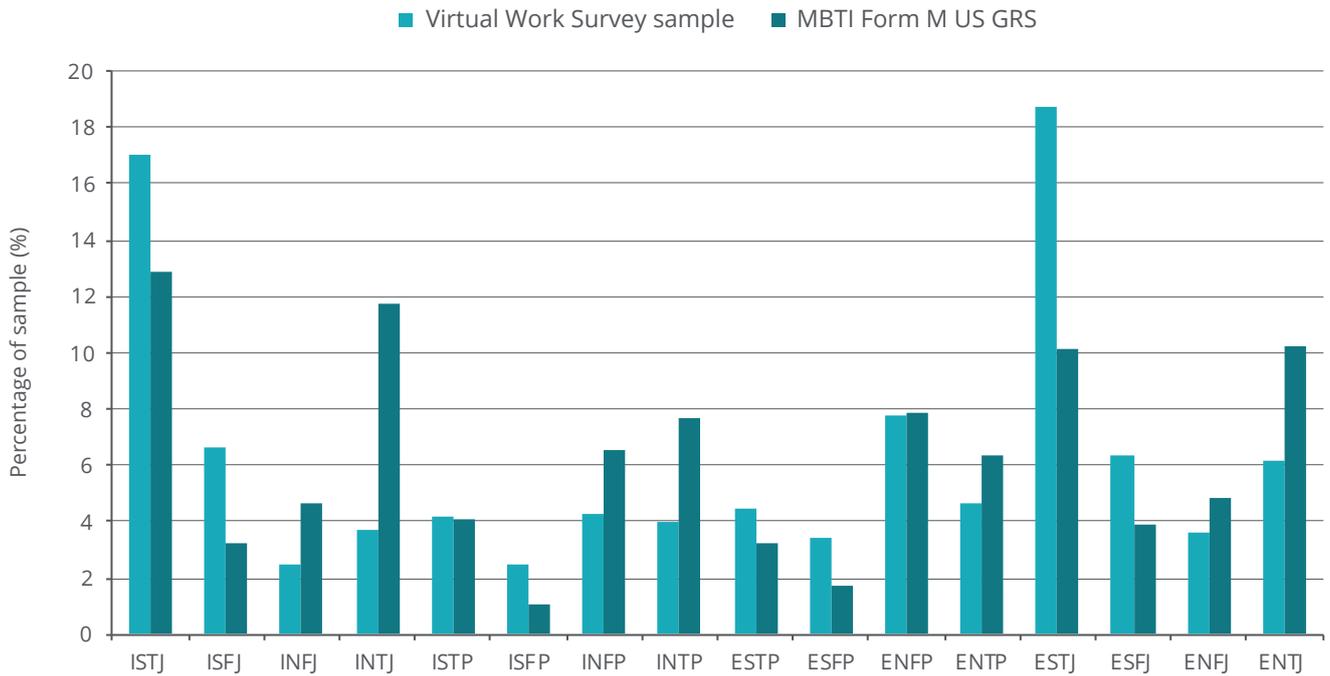


Figure 7 | MBTI® Type distributions of the Virtual Work Survey Sample and MBTI® Form M US GRS

Note: Virtual Work Survey sample, N = 1,622; MBTI® Form M US GRS, N = 3,009.

or even in the company office but not using office connections. Options included three subcategories of mobile worker – internally transient, externally mobile, and internally mobile – in an attempt to capture some of the newer work setting arrangements being used in organizations. (More information about mobile workers is provided later in this section.)

### Work activity items

Six items measured various activities that might be performed while working in different settings. The items were all asked using a five-point response scale ranging from 1 = never to 5 = always. The activities measured included the following:

- Spend time focused on a specific task
- Take a break from work to talk with others
- Take a break from work for some quiet time
- Multitask with work and nonwork activities
- Work with background noise (TV, radio, podcasts)

- Use work-based social media sites, such as LinkedIn or Slack

### Outcome of virtual work items

The survey included 13 items asking respondents to rate various outcomes they experienced when working virtually. Each outcome was rated on a five-point response scale ranging from 1 = disagree to 5 = agree. The outcomes measured included

- I am more productive
- I miss being able to talk to people informally
- I am less stressed
- I enjoy the solitude.
- I am more engaged with my work
- I feel lonely
- I am better organized
- I take more breaks from work
- I am frustrated by slow communication from co-workers

- I feel isolated
- I am not aware of what is happening in my organization
- I can be easily reached by co-workers
- I can easily reach my co-workers

### Training and development preference items

Training and development preferences were evaluated from a number of perspectives. First, seven items asked about the usefulness of different training and development approaches (videos, lectures, textbooks/reading, PowerPoint presentations, group discussions, live webinars, and recorded webinars) using a five-point scale ranging from 1 = useful to 5 = useless. Next, four items asked how valuable respondents found different training features (self-paced online modules, virtual interactions, video capability, multimedia) on a five-point scale ranging from 1 = not valuable at all to 5 = very valuable. Finally, three items examined respondents' preference for either attending training alone or

as part of a group, and for in-person versus online training and development.

### Type of work items

A series of questions developed to examine potential behavioral differences based on work location were also included. These items examined different activities individuals might engage in while at work, using a five-point response scale ranging from 1 = never to 5 = always.

### Survey outcomes

Study 2 results based on the survey items detailed above are summarized next. First is a detailed look at three items related to virtual, mobile, and traditional work and personality type, with a goal of identifying how MBTI type is related to work setting

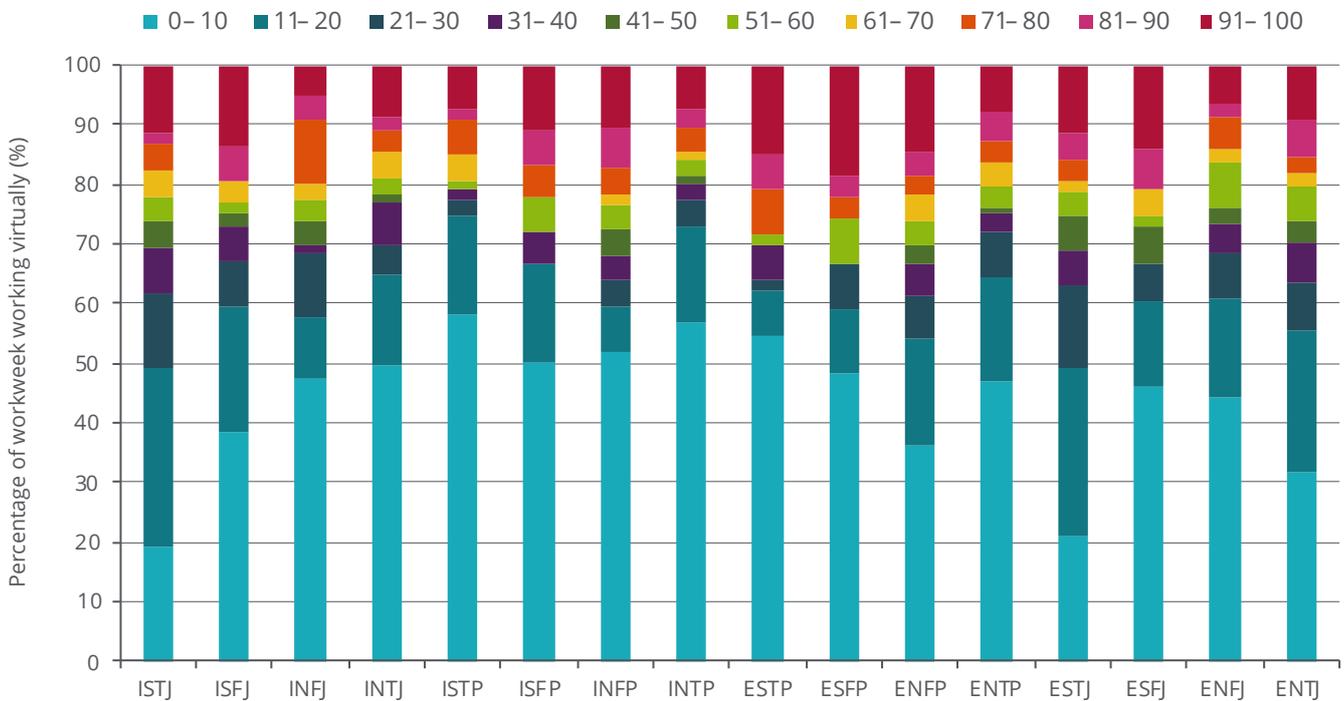


Figure 8 | Percentage of workweek spent working from a home or other remote office

Note: Work Survey sample, N = 1,622.

arrangements. Next, the remaining content areas (e.g., work activities and outcomes of virtual work), are examined based on work setting categories (traditional, mobile, or virtual) developed as a result of the analysis of the Virtual Work Survey items, as well as MBTI types. The items on training and development preferences are examined based solely on MBTI type preferences.

### Frequency of traditional, mobile, and virtual work in the survey sample by MBTI® type

The three items used to examine traditional, mobile, and virtual work are examined next by MBTI type.

Each of the items differed in the specific information that was asked, providing different perspectives on traditional and nontraditional work setting arrangements.

The first item was the same as the one used in study 1: “Percentage of time spent working in a remote or home office.” Results are summarized in figure 8.

Compared to figure 1 (p. 4), Figure 8 shows much more variability in the relative reporting of time spent working from home or other remote location. In the survey sample, only 20% of individuals with preferences for ISTJ reported working from home or other remote location 10% of the time or less.

In contrast, 58% of individuals with preferences for ISTP reported working from home or other remote location less than 10% of the time. On the other end of the measure, 18.5% of individuals with preferences for ESFP were most likely to report spending 91–100% of their time working from home or other remote location, while only 5.3% of those with preferences for INFJ reported spending 91–100% of their time working from home or other remote location. Differences between the estimates from study 1 and

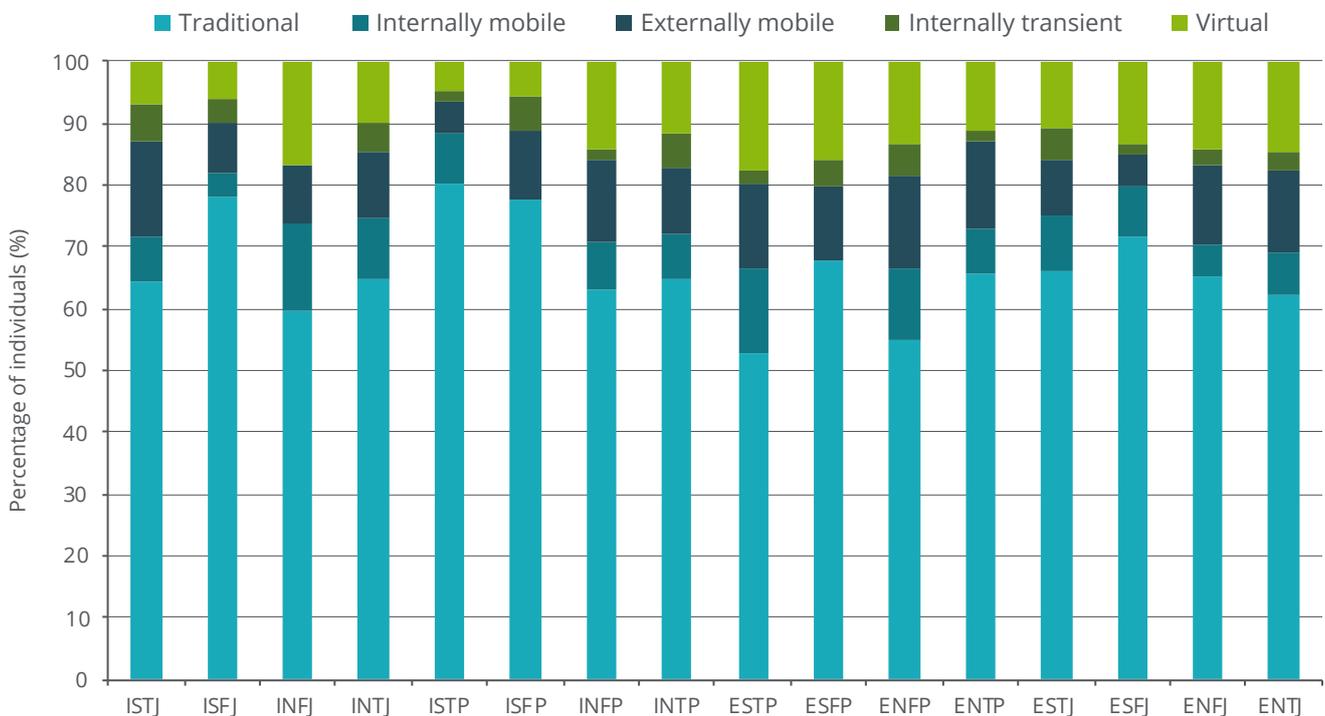


Figure 9 | Traditional, mobile, and virtual work setting arrangements based on MBTI® Type

Note: Work Survey sample, N = 1,622.

study 2 are due in part to sample size, and the fact that completing a survey requires more time and effort than a single demographic item as part of an overall assessment process.

Therefore, readers interested in a best estimate of the prevalence of employees working virtually should refer to study 1 results.

A second survey item was intended to differentiate between traditional, mobile, and virtual workers by asking individuals to describe how they utilize the central office location during a typical week.

The mobile category was further refined into subcategories internally mobile, externally mobile, and internally transient. Each of these terms describes a different form of mobile work that does not require the use of a home office or other remote office typically associated with virtual work.

Options included the following:

- I do not have an assigned workspace and typically do not work from the central office location. **[virtual worker]**
- I do not have an assigned workspace and typically do work from the central office location. **[internally transient mobile worker]**
- I do have an assigned workspace but typically work offsite from the central office location. **[externally mobile worker]**
- I do have an assigned workspace but typically work in a different area of the central office location. **[internally mobile worker]**
- I do have an assigned workspace and typically work in that assigned workspace at the central office location. **[traditional worker]**

Results for this item by MBTI type are summarized and presented in figure 9, which indicates that, as

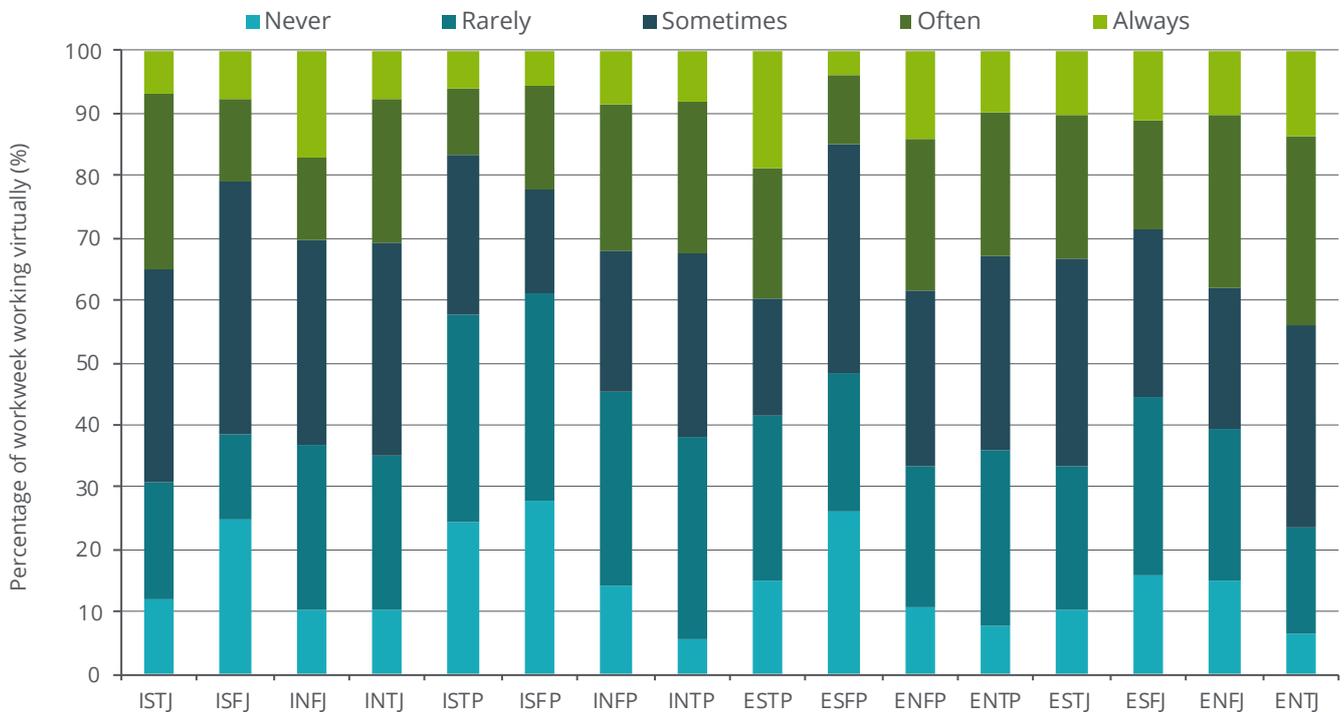


Figure 10 | Self-Reported frequency of Virtual Work by MBTI® Type

Note: Work Survey sample, N = 1,622.

**Table 3 | Analysis of work activities based on work setting arrangement category**

Work activity	N	M			SD			N Df	D Df	F	Sig.
		Traditional	Mobile	Virtual	Traditional	Mobile	Virtual				
Spend time focused on a specific task	1,439	3.93	3.95	4.03	0.655	0.605	0.644	2	1,436	1.955	0.142
Take a break from work to talk with others	1,440	3.13	3.10	2.91	0.803	0.798	0.848	2	1,437	5.488	0.004
Take a break from work for some quiet time	1,438	2.56	2.54	2.61	0.955	0.923	0.932	2	1,435	0.369	0.691
Multitask with work and non-work activities	1,437	3.06	3.09	3.12	1.073	1.044	1.008	2	1,434	0.267	0.766
Work with background noise (TV, radio, podcasts)	1,436	2.79	2.88	2.74	1.372	1.284	1.290	2	1,433	1.270	0.281
Use work-based social media sites, such as LinkedIn or Slack	1,438	2.12	2.40	2.63	1.106	1.123	1.088	2	1,435	16.818	0.001

Note: Virtual Work Survey sample, N = 1,622. Green indicates a significantly lower mean than for the other categories; orange indicates a significantly higher mean.

was found in study 1, most workers still work in a traditional fashion. On this item, individuals with preferences for ESTP were most likely to report being a virtual worker, while those with preferences for ISTP were least likely to report being a virtual worker. Only a small percentage of workers, across all 16 types, reported being internally transient; individuals with preferences for ENFP were most likely to report being externally mobile, and ISTPs were most likely to report being a traditional worker. Individuals with preferences for INFJ and ESTP, and to a lesser extent ENFP, were more likely to report being internally mobile.

Finally, another item on the survey asked respondents to indicate how frequently they worked remotely. The results for this item are summarized in figure 10. Here, nearly 30% of ISFPs reported that they never work remotely, while only 6.6% of ENTJs indicated that they never work remotely. On the other end of the measure, nearly 20% of ESTPs indicated that they always work remotely, while only 5.6% of

ISFPs, followed by 6.1% of ISTPs, indicated that they always work remotely.

**Summary of virtual work items and MBTI® type**

Analysis of the frequency distributions of the three virtual work items suggests that there are some small differences based on MBTI type regarding the degree to which people work in a traditional, mobile, or virtual manner. However, the patterns are not clear across the three items, suggesting that the specific way an item is asked changes how individuals respond, or that the concepts of traditional, mobile, and virtual work are not clear to the them. To further examine this issue, Pearson and Spearman correlations were computed among the three items. The items were found to correlate fairly highly, but not so highly as to suggest redundancy. The average correlation (ignoring the direction of the correlation) was  $r = .44$ . As a result, data from study 1, which are based on a much larger sample, likely provide the

**Table 5 | Analysis of outcome item results based on work setting arrangement category**

Outcome Item	N	M			SD			N Df	D Df	F	Sig.
		Traditional	Mobile	Virtual	Traditional	Mobile	Virtual				
I am more productive.	1,502	3.56	4.03	4.18	1.11	0.99	0.99	2	1,499	40.044	0.001
I miss being able to talk to people informally.	1,499	3.43	3.37	3.57	1.24	1.27	1.25	2	1,496	2.166	0.115
I am less stressed.	1,500	3.82	3.90	4.00	1.01	1.09	1.10	2	1,497	1.993	0.137
I enjoy the solitude.	1,496	3.67	3.76	3.59	1.10	1.15	1.22	2	1,493	2.396	0.091
I am more engaged with my work.	1,497	3.57	3.89	3.88	1.11	1.08	1.11	2	1,494	13.995	0.001
I feel lonely.	1,498	2.44	2.31	2.35	1.20	1.25	1.28	2	1,495	1.649	0.193
I am better organized.	1,487	3.33	3.63	3.76	1.04	1.08	1.09	2	1,484	16.514	0.001
I take more breaks from work.	1,499	3.06	2.74	2.65	1.22	1.27	1.37	2	1,496	12.259	0.001
I am frustrated by slow communication from co-workers.	1,495	3.11	2.90	3.00	1.16	1.26	1.32	2	1,492	4.383	0.013
I feel isolated.	1,489	2.34	2.18	2.30	1.21	1.24	1.26	2	1,486	2.822	0.060
I am not aware of what is happening in my organization.	1,494	2.96	2.58	2.68	1.23	1.26	1.29	2	1,491	14.407	0.001
I can be easily reached by co-workers.	1,500	4.25	4.51	4.67	0.86	0.75	0.59	2	1,497	28.582	0.001
I can easily reach my co-workers.	1,499	3.91	4.15	4.23	0.93	0.93	0.89	2	1,496	13.651	0.001

Note: Virtual Work Survey sample, N = 1,622. Green indicates a significantly lower mean than for the other categories; orange indicates a significantly higher mean.

best estimate of the type distribution and the extent to which individuals work virtually.

Given the correlations among the items, and the desire for the remaining analyses to provide as much clarity and insight as possible, the three items were combined to create a new category, termed “work setting arrangement.” Based on the pattern of responses across all three items, respondents were categorized as either traditional, mobile, or virtual. Individuals whose responses across the

three items were inconsistent were removed from remaining analysis in order to provide as much clarity as possible regarding traditional, virtual, and mobile work. As a result of some individuals being removed, the sample was reduced to 1,521 respondents.<sup>1</sup>

The new work setting arrangement category variable was then examined to see whether the updated approach led to differences in the distribution of MBTI type preferences. To evaluate any differences, chi-square analyses were conducted. The results

indicated that there were no distribution differences based on the work setting arrangement category for the E-I and S-N preference pairs; however, there were significant differences on T-F and J-P.<sup>2</sup> The results showed that individuals with preferences for Thinking and Judging were more likely to fall in the mobile or virtual work category, and those with preferences for Feeling and Perceiving were more likely to fall into the traditional work category. A validation check was run on the reclassification using four of the work preference items, and the results indicated that the reclassification was consistent with the reported rates of interacting with co-workers face-to-face and virtually, as well as outside parties face-to-face and virtually. The revised work setting arrangement category variable is used for the remaining analyses. Given the small differences in worker categories and MBTI types and preferences, the remaining analyses examine type preferences and worker categories in separate analyses.

## Work activities

Work activities were analyzed based on two different criteria: work setting arrangement category and MBTI preferences. A summary of these analyses follows.

### Work activities based on work setting arrangement category

Analyses were conducted to compare the degree to which work-related activities differed based on the work setting arrangement category variable. The results of these analyses are reported in table 3.<sup>3</sup> The results show that there were few differences based on worker categories, with only two of the six items showing significant differences. Virtual workers were less likely to indicate that they take a break from work to talk to others compared to both traditional and mobile workers. On the other hand, virtual workers were more likely to indicate that they use work-based social media sites compared to traditional and mobile workers. On these same items, mobile workers also differed significantly from traditional workers, who

reported the least use of work-based social media sites.

### Work activities based on MBTI® type preferences

The same set of items presented in table 3 were analyzed based on MBTI preference pairs rather than whole four-letter MBTI type due to the small sample sizes for some of the whole types. Those items with significant differences are reported in table 4 (p. 15). The differences found from the set of six total items are consistent with what would be expected but are also likely confounded due to completing the analyses based on preferences rather than whole types. Differences were found on at least one preference pair for all the work activity items. Rather than means and standard deviations, the table reports the conclusions drawn from the analysis, where the item is listed under the preference with the significantly larger mean for the preference pair comparison.

### Analysis by work setting arrangement category

The outcome items were examined based on the revised variable of traditional, mobile, or virtual work.<sup>4</sup> The results for the items are summarized in table 5. The results show a clear pattern of differences between the traditional workers compared to the mobile and virtual workers. Significant mean differences are indicated with color coding. The table shows that when working virtually, traditional workers feel less productive compared to those who are classified as mobile or virtual workers.

Similarly, traditional workers feel less engaged, less well organized, and less able to reach or be reached by their co-workers compared to mobile and virtual workers. Mobile and virtual employees, when working remotely, report feeling less lonely and taking fewer breaks from work. Overall, the pattern of results suggests that each worker category, specifically traditional compared to mobile and virtual, find working in a manner that is consistent with their typical work experience more positive – a result that is not surprising. However, an implication of this finding is that should an organization transition traditional workers to mobile or virtual status, there might be

negative reactions. Similarly, transitioning a mobile or virtual worker to a traditional status might result in some negative reactions as well. It is also important to note that no differences were found for their missing informal conversations, stress, feelings of solitude, frustration with communication, or feeling isolated.

**Table 4 | Significant differences on work activity items based on MBTI® type preferences**

MBTI® preferences	
<p><b>Es are more likely to endorse:</b></p> <ul style="list-style-type: none"> <li>Take a break from work to talk with others</li> <li>Multitask with work and nonwork activities</li> <li>Use work-based social media sites, such as LinkedIn or Slack</li> </ul>	<p><b>Is are more likely to endorse:</b></p> <ul style="list-style-type: none"> <li>Take a break from work for some quiet time</li> </ul>
<p><b>Ss are more likely to endorse:</b></p> <p>–</p>	<p><b>Ns are more likely to endorse:</b></p> <p>–</p>
<p><b>Ts are more likely to endorse:</b></p> <p>–</p>	<p><b>Fs are more likely to endorse:</b></p> <ul style="list-style-type: none"> <li>Multitask with work and nonwork activities</li> <li>Work with background noise (TV, radio, podcasts)</li> </ul>
<p><b>Js are more likely to endorse:</b></p> <ul style="list-style-type: none"> <li>Spend time focused on a specific task</li> </ul>	<p><b>Ps are more likely to endorse:</b></p> <p>–</p>

Note: Adapted from the MBTI® Manual (Myers, McCaulley, Quenk, & Hammer, 1998).

### Analysis by MBTI® type preferences

The outcome items were also examined based on MBTI preference pairs,<sup>5</sup> again due to some of the very small sample sizes for whole type. Significant differences are summarized in table 6 based on the preference that had a statistically significantly higher mean score for each of the items in table 5. The results for the outcome items are largely consistent

with expectations based on MBTI type preferences. For example, individuals with a preference for Extraversion reported higher levels of missing informal talks, being lonely, and feeling isolated, while those with a preference for Introversion reported higher levels of enjoying the solitude and being more engaged with their work.

In addition to the outcome items reported above, the Virtual Work Survey asked respondents to respond to two open-ended items. Specifically, they were asked to indicate where they typically worked when working remotely and how they felt about working remotely. Their responses were compiled to form word clouds for each whole type. Two exemplar word clouds for this item for individuals show how working remotely makes them feel. Similarly, regarding the feelings associated with working remotely, ESFPs were more likely to indicate responses such as “isolated” or “disconnected,” whereas ISTJs indicated more positive attributes, such as “focus.”

### Training and development items

The items focused on preferences for training and development were examined based on MBTI type.<sup>6</sup> These items provide insights into how type differences may impact training and development preferences that a trainer may want to consider when developing traditional, virtual, and mixed training activities. The items were not specific to MBTI training; however, the items are summarized based on MBTI type preferences. The results are grouped under three headings: usefulness, value, and training preferences.

#### Usefulness

- Es find videos and live webinars slightly more useful than do Is.
- Es find lectures and PowerPoint presentations with speakers somewhat more useful than do Is.
- Is find textbooks/reading somewhat more useful than do Es.

- Es find group discussions a lot more useful than do Is.
- Is find recorded webinars slightly more useful than do Es.
- Ss find videos somewhat more useful than do Ns.
- Ns find textbooks/reading and group discussions slightly more useful than do Ss.
- Ss find PowerPoint presentations with speakers slightly more useful than do Ns.
- Ts find lectures somewhat more useful than do Fs.
- Ts find textbooks/reading slightly more useful than do Fs.
- Ps find videos somewhat more useful than do Js.
- Ps find lectures slightly more useful than do Js.
- Ps find group discussions slightly more useful than do Js.

**Table 6 | Significant differences on outcome items based on MBTI® type preferences**

MBTI® preferences	
<b>Es are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I miss being able to talk to people informally.</li> <li>■ I feel lonely.</li> <li>■ I feel isolated.</li> </ul>	<b>Is are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I am less stressed.</li> <li>■ I enjoy the solitude.</li> <li>■ I am more engaged with my work.</li> <li>■ I am better organized.</li> </ul>
<b>Ss are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I can easily reach my co-workers.</li> </ul>	<b>Ns are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I miss being able to talk to people informally.</li> <li>■ I feel lonely.</li> </ul>
<b>Ts are more likely to endorse:</b> <ul style="list-style-type: none"> <li>–</li> </ul>	<b>Fs are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I miss being able to talk to people informally.</li> <li>■ I feel lonely.</li> <li>■ I take more breaks from work.</li> <li>■ I feel isolated.</li> </ul>
<b>Js are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I am more productive.</li> <li>■ I am more engaged with my work.</li> <li>■ I am better organized.</li> </ul>	<b>Ps are more likely to endorse:</b> <ul style="list-style-type: none"> <li>■ I miss being able to talk to people informally.</li> <li>■ I am not aware of what is happening in my organization.</li> </ul>

Note: Adapted from the MBTI® Manual (Myers et al., 1998).

### Value

- Video capability to see others was rated as less valuable by more people (of all types) than other methods.
- Es reported that self-paced online modules, video interaction with trainer and fellow participants (e.g., whiteboards, chat, polls), and video capability to see others are more valuable than do Is.
- Es report multimedia is slightly more valuable than do Is.



- Ss find video capability to see others somewhat more valuable than do Ns.
- Ns find multimedia more valuable than do Ss.
- Ts find self-paced online modules slightly more valuable than do Fs.
- Fs find video capability to see others slightly more valuable than do Ts.
- Ts find multimedia somewhat more valuable than do Fs.
- Js find self-paced online modules somewhat more valuable than do Ps.
- Ps find multimedia slightly more valuable than do Js.

### Training preferences

- Is say they prefer training alone a lot more than do Es, while Es have a slight preference for small groups and somewhat more of a preference for large groups.
- When assigned to attend a training, Is would prefer to attend with people they know a lot more than do Es. More Es typically say it doesn't matter if they attend alone, with people they know, or with people they don't know.

- Is prefer online delivery of training and slightly prefer a combination of online/in-person training more than do Es, while Es have a preference for in-person training. At least half of both Es and Is prefer a combination of training formats.
- When attending a work meeting, Is slightly prefer to attend via phone more than do Es, and Es slightly more than Is prefer to attend in-person. The vast majority of Es and Is prefer to attend in-person.
- Ns prefer training alone slightly more than do Ss.
- At least 40% of Ss and Ns prefer both in-person training and a combination of in-person and online training. Slightly more Ns prefer online training, while slightly more Ss prefer a combination.
- Fs somewhat prefer training in small groups more than do Ts.
- When assigned training, Fs prefer attending with people they know more than do Ts.
- When assigned training, more than 50% of Ts and Fs say it doesn't matter, but more Ts than Fs say it doesn't matter who they attend with.
- Fs prefer online training slightly more than do Ts, while more Ts than Fs prefer a combination of in-person and online training.



- Across all types, the clear preference (more than 85%) for attending meetings is in-person.
- Fs prefer attending meetings on the phone slightly more than do Ts, while Ts prefer video- conferencing slightly more than do Fs.
- Ps prefer attending training in-person slightly more than do Js.

## Study 2 Conclusions

As was found in study 1, the majority of survey respondents in study 2 still work in a traditional work space. However, working virtually from a home office or other remote location is also more common than internally mobile work setting arrangements. Overall, study 2 further suggests that the T-F and J-P preference pairs are the most likely to distinguish work setting arrangement choices, as was found previously by Schaubhut et al. (2008). Differences that were largely consistent with expectations for type theory were found for the examination of work activities, and for outcomes of virtual work. Perhaps contrary to what some might expect, the differences in training and development preferences were generally small, suggesting individuals of all types have similar desires for training and development delivery.

Few differences were found based on the work setting arrangement variable, and were largely consistent with what would be expected with virtual workers reporting taking breaks to talk to co-workers less often and using social media sites more often. The differences on the outcome items generally showed that individuals who work in a virtual or mobile arrangement also report positive outcomes from such arrangements – including being more productive, engaged, and better organized, as well as being less lonely – but at the same time feeling less aware of what is happening in their organization. Perceptions of communication (reaching others and being reached) were also higher for virtual and mobile workers.

## Study 3: Effectiveness of virtual training

A third study examines the impact of an introductory MBTI assessment training session on outcome measures being developed by The Myers-Briggs Company and compares virtual training sessions to traditional in-person training sessions. The basic question being asked in study 3 is whether there is a difference in the effectiveness of virtual training for the MBTI assessment compared to traditional training. Data are drawn from two virtual trainings conducted completely online (n = 22, with data at all measurement periods), and one traditional session (n = 18, with data at two measurement periods) conducted in-person. Data from the virtual and traditional sessions are aggregated to allow comparisons between the two training mediums.

The data are based on six items used across all the measurement occasions and are drawn from a larger pool of outcome measures being evaluated. The six items that match across the different virtual and in-person training sessions and were administered both pre- and post-training include the following:

- I understand how my MBTI type influences my behaviors at work.
- I understand how my MBTI type influences my behaviors at home.
- I am aware of how to tailor my interactions to best accommodate the MBTI type preferences of my team members.
- I apply my knowledge of MBTI type to manage conflict with others.
- I apply my knowledge of MBTI type to help address interpersonal challenges.
- I apply my knowledge of MBTI type to enhance my interpersonal relationships.

The item responses across all six items and all respondents exposed to a particular training medium (virtual versus in-person) for each measurement occasion were aggregated. Note that for the virtual trainees, data were collected prior to the session (time 1), immediately after the session (time 2), and again 30 days after the training session was



**Figure 13 | Training outcomes of virtual versus traditional training sessions**

Note: Virtual training conducted three times, N= 22; traditional training conducted twice, N =18.

completed (time 3). The traditional sessions collected data prior to the start of the training (time 1) and again 30 days after the training was completed (corresponding to time 3 for the virtual trainees). The results are summarized in figure 13. The figure shows that the virtual trainees started with a higher level of knowledge about the MBTI assessment compared to the traditional trainees. In addition, an immediate gain in knowledge is apparent immediately after the training is completed. Most important perhaps, both traditional and virtual trainees held on to the knowledge gain 30 days after the training was completed.

For the items included in the combined measure, the item “I apply my knowledge of MBTI type to enhance my interpersonal relationships” showed statistically significant differences from time 1 to times 2 and 3. In addition, the items on tailoring communication style, managing conflict, and addressing interpersonal challenges were significantly different at time 2 compared to time 1. Note that these are impressive findings given the very small samples on which the analyses were conducted. Finally, the overall results at time 3 show that both approaches are equivalent in the longer-term gain in knowledge. While based on a small sample of trainings, these results are encouraging in that as the need for virtual training

grows, there is evidence that the outcomes of the training, following the recommendations in this paper, lead to similarly positive outcomes as traditional face-to-face training.

### Study 3 Conclusions

Study 3 shows – albeit in a small sample and consisting of only a few training sessions – that there are no differences in the effectiveness of traditional training compared to virtual training when conducting an “Introduction to MBTI” workshop. Although preliminary, this result is highly encouraging for individuals who may find a face- to-face MBTI workshop unfeasible. However, more research needs to be conducted with larger samples.

On the whole, the study suggests that the move to virtual training due to an increasingly virtual workforce may still reside years into the future.

Further, it suggests that for virtual and face-to-face MBTI workshops, trainers can expect a similar mix of types across the training modality used. As such, radical changes to the delivery of MBTI workshops are not needed in the short term. However, for those who find the need for virtual MBTI training, some practical advice is offered next.

### Suggestions for virtual training using the MBTI® assessment

While there are best practices for virtual training with a technical and platform focus, the following suggestions are based on integrating MBTI preference knowledge to ensure that all participants are engaged. As our research has shown, virtual trainees may be of any MBTI type, just as with trainees in traditional in-person training. Beyond virtual status, many other factors – such as industry, level in organization, and the participant’s job or role – impact the MBTI preference distribution; however, the delivery method – virtual versus in-person – is not

determining factor in who is likely to attend a virtual training. Therefore, the expectation when designing and delivering virtual training should be a similar distribution followed by a focus on exceptions that may be present based on the particular audience.

The following recommendations are specific to each preference. Practitioners should consider these points during their training design and delivery.

In consideration of individuals with a preference for Extraversion, practitioners should

- Give them a chance to develop ideas through discussion with the other participants
- Allow unmuted verbal questions as well as interactive feedback
- Promote active participation in the process, as opposed to individual reading and solo assignments
- Create live interaction with other participants, showing their pictures and names where appropriate

In consideration of those with a preference for Introversion, practitioners should

- Build in time for them to reflect and develop ideas internally before responding – this could be in the form of pre-work before the session and follow-up assignments
- Provide them with written as well as verbal information and instructions
- Give them the opportunity to work or reflect alone, in addition to group exercises
- Ensure that the training can take place in a quiet environment with protection from interruptions

In consideration of those with a preference for Sensing, practitioners should

- Provide clear and sequential directions, information, and explanations
- Share concrete examples and practical applications for the topic

- Show appreciation for thoroughness and attention to detail
- Include ample specific data to back up their conclusions

In consideration of those with a preference for Intuition, practitioners should

- Allow room for flexibility and creativity in reaching the goals of the training
- Lay out the big picture and a framework that links the training objectives to the exercises
- Allow space for getting off topic, brainstorming, and developing new ideas that may lead to a richer learning experience
- Not insist on one “right” way but rather provide alternatives or allow room for exploration

In consideration of those with a preference for Thinking, practitioners should

- Provide a logical explanation for the objectives
- Allow time for questions and analysis of the topic
- Build in opportunities for them to consider the pros and cons and weigh alternatives
- Provide a sense of fairness in how the rules and procedures lead to accomplishing the tasks

In consideration of those with a preference for Feeling, practitioners should

- Incorporate feedback and recognition regarding progress and successes
- Make a connection showing how the topic impacts people and relationships
- Create live connections between participants during the training as well as follow up individually afterward
- Show respect for individual values and how they may impact their learning

In consideration of those with a preference for Judging, practitioners should

- Provide structure, clear goals, and a schedule
- Stay organized and respect stated timelines
- Celebrate completion of tasks and reaching goals

In consideration of those with a preference for Perceiving, practitioners should:

- Make room for flexibility on the completion of goals, possibly in the form of pre- and post- training due dates that allow individual freedom within a larger time frame
- Recognize the value of spontaneous contributions to the training
- Make space for new information that may be relevant

And finally, practitioners should consider their own MBTI preferences and the impact they may have on their desired design and delivery techniques. An unconscious bias toward the practitioner's own type often shows up as overrepresentation or underrepresentation of the needs of different MBTI preferences. For example, practitioners with a preference for Intuition may need to include more details than they would normally like in order to accommodate individuals with a Sensing preference.

## Summary

The series of studies reported here show that work has not changed as much as the popular press has implied with regards to work setting arrangements. Indeed, over two-thirds of the respondents in these studies remain in traditional work arrangements. Study 2 shows that MBTI type, particularly the T-F and J-P preferences, play some role in people's work setting arrangements but perhaps not to the extent expected. In addition, and perhaps surprisingly, the E-I preference pair plays a limited role. The study also shows that people who do work in virtual or mobile arrangements find it to be a positive experience overall in terms of work outcomes but do report a small degree of perceived isolation. Finally, study 3 shows that virtual MBTI training is as effective as traditional face-to-face MBTI training.

## Notes

1. The three items on work setting arrangement and frequency of virtual work (see figures 1, 2, and 7) were combined to create the work setting arrangement variable. Individuals who indicated not having an assigned office and worked remotely sometimes, often, or always were categorized as virtual workers. Those indicating that they were mobile workers (having an assigned space but not typically using it) and who indicated that they worked remotely sometimes, often, or always, were categorized as mobile. Those who indicated that they had a traditional work arrangement and never or rarely worked remotely were categorized as traditional workers. These categorizations were then compared for consistency with the archive item and found to be largely consistent with the extent to which respondents worked virtually. Those individuals whose response patterns did not fit (i.e., were self-contradictory) were dropped from this classification. The sample characteristics of the revised sample largely matched those reported in Figure 3.
2. Chi-square analysis for T-F: ( $\chi^2(2) = 14.5, p < .001$ ); chi-square analysis for J-P: ( $\chi^2(2) = 13.98, p < .001$ ).
3. Based on a t-test ( $p < .05$ ).
4. One-way analysis of variance (ANOVA) with Tukey post hoc analyses were conducted.
5. T-tests were conducted for the outcome-related items for each of the preference pairs. No adjustment was made for the experimentwise error rate.
6. Analyses were also conducted based on the revised work setting arrangement category variable, but no differences emerged. This lack of differences indicates that training preferences, value, and utility of training and development options do not differ based on whether an individual is a traditional, mobile, or virtual worker.

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