

The Well-Being Assessment for Productivity

A Well-Being Approach to Presenteeism

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Objective: To develop a presenteeism assessment, the *Well-Being Assessment for Productivity (WBA-P)*, that provides an informative evaluation of job performance loss due to well-being related barriers. **Method:** The WBA-P was developed using exploratory and confirmatory factor analysis using survey data from 1827 employed individuals. Evidence of criterion-related validity was established using multivariate analysis of variance across measures of health and well-being. **Results:** A hierarchical, two-factor model demonstrated good fit and included factors capturing productivity loss from personal reasons (WBA-PP) and work environment (WBA-PW). Significant interactions existed between these and previously validated presenteeism measures with respect to physical and emotional health, risk factors, and life evaluation. **Conclusions:** This initial psychometric evidence suggests that the WBA-P and its subscales are valid measures of presenteeism that capture actionable well-being-related performance barriers.

Employee productivity is a core component of a company's ability to generate revenue. As productivity declines, organizations struggle to maintain profitability and growth. While research has shown that absenteeism has a substantial negative impact on business performance,¹ recent studies suggest that unproductive workers who are present may have a more dramatic impact on costs.² Presenteeism is the term used to describe employees who are physically present at their jobs, but experience decreased productivity because of illness or other barriers to performance.

Recent interest in presenteeism measurement and research stems from the idea that solving the presenteeism problem results in considerable savings and can serve as a competitive advantage for companies.^{3,4} One national survey estimated that sickness presenteeism cost the United States more than \$150 billion annually and accounts for 71% of the total cost of lost productivity.⁵ Studies estimate that total productivity loss, accounting for both health-related presenteeism and absenteeism, costs companies three times what they pay for pharmacy and medical claims.⁶ Although the current science of converting self-reported productivity scales into monetary units has many limitations,⁷ the evidence is sufficient to conclude that there is significant economic opportunity through reducing presenteeism. Specifically, investment in wellness programs that target presenteeism stemming from health issues present a strong opportunity for cost savings, but researchers have yet to quantify the impact of other barriers to performance in the context of presenteeism.

To date, many studies define presenteeism as productivity loss due to illness and attempt to quantify the impact of health conditions and symptoms on productivity.^{8,9} This approach is consistent with the tradition of interventions that target health risk, illness, and disease. There is a growing movement, however, toward a more inclusive view of improving health that encompasses an individual's overall well-being with an aim of improving the functioning of the whole individual at home, at work, and in the community.¹⁰ Domains of well-being, such as physical and emotional health, work environment, and basic access to resources are important to capture, especially in conjunction with measures of key outcomes of well-being, such as job performance and productivity. Such concurrent measurement allows organizations to diagnose problem locations or departments and identify the strongest drivers of key outcomes.

Consistent with a multifaceted well-being approach, researchers have argued that capturing sources of presenteeism from a range of life domains provides a more inclusive and accurate picture of productivity loss for companies.¹¹ There is an abundance of literature, summarized below, linking health, work, and personal problems to performance on the job. Accordingly, measures of presenteeism that determine how aspects of each of these well-being-related areas act as barriers to productivity can provide a more informative evaluation of productivity loss than measures focusing only on illness.

Pragmatically, organizations interested in improving the performance of their employees have a need to identify, understand, and target the aspects of well-being potentially leading to productivity loss. To date, however, existing measures of presenteeism, some of which are single-item indicators, have focused on productivity loss due to general health or specific illnesses.³ For instance, the Work Productivity and Activity Impairment Questionnaire (WPAI) measures the impairment of work and other activities due to overall health and symptoms,⁸ while measures like the Stanford Presenteeism scale can be used to assess productivity loss from specific health problems.⁹ Another widely used measure, the absolute presenteeism item from the Health and Work Performance Questionnaire (HPQ), captures general productivity on the job but does not assess the cause(s) of any productivity loss. Consequently, this measure has historically been used in conjunction with self-reported illness to study the association between presenteeism and specific health conditions.^{12,13} Such studies strengthen the business case for health enhancement programs but do not demonstrate the causes of productivity loss through direct relationships with health problems or other potential sources of that loss. For organizations to more effectively improve productivity, there is a need for presenteeism measures that are both specific in providing actionable information, and more holistic in capturing the range of well-being-related barriers that affect productivity at work.

Studies from multiple disciplines have linked productivity loss to barriers from a person's health, work, and personal life domains. With respect to health, in addition to the well-established link between physical health conditions and presenteeism discussed earlier, substantial productivity loss can stem from emotional health problems, such as depression and anxiety. In a study of more than 12,000 Dow Chemical Company employees, emotional problems were the greatest source of productivity loss when compared to a

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The research presented was conducted by Pro-Change Behavior Systems, Inc, and was funded by Healthways, Inc. Research design and the drafting and editing of the manuscript was a collaborative effort among all authors, who are employees of either the University of Rhode Island or Pro-Change Behavior Systems or Healthways.

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DOI: 10.1097/JOM.0b013e318222af48

range of other chronic conditions, reducing worker performance by about 36%.¹

Other research has focused on the ways in which organizational constraints and psychosocial characteristics of the workplace impair worker productivity. Organizational constraints, such as work overload, lacking needed tools or technology, lacking necessary budgetary resources, and lacking training or preparation, can prevent workers from successfully performing their job.^{14,15} Moreover, when job resources are insufficient for meeting work demands, workers experience stress which may hinder performance. A meta-analysis found that measures capturing performance barriers such as these are related to general and supervisor-rated performance.¹⁶ Interestingly, meta-analytic findings on the work overload-performance relationship were more complex—overload had weak links to supervisor and self-ratings of performance, but a moderate relationship with qualitative assessments of performance.¹⁶ These qualitative assessments were defined as “a measure of how well the job was done,” which suggests that as workload increases, perceptions of productivity do not necessarily change but the quality of the product or output declines.

Besides organizational constraints and inadequate resources, an integrative measure of productivity loss should also consider the impact of social interactions and dynamics in the workplace. Interpersonal issues with coworkers and/or supervisors such as work interruptions, incivility, and various other forms of conflict impair a person's ability to effectively complete job tasks.^{17,18} Beyond the connection to performance, some more extreme forms of conflict have been shown to be toxic for employee well-being.¹⁹ Including organizational and interpersonal barriers in a measure of presenteeism bridges multiple streams of research all aimed at improving employee performance.

Lastly, other contributors to an individual's well-being should be considered as potential sources of productivity loss, an individual's home and personal life is another source of reduced functioning. Demands at home, such as caring for dependent adults and children and financial worries, have been shown to spillover and lead to reduced performance in a person's work role.²⁰ Overall, these and other research findings provide a wealth of evidence in support of a more inclusive approach to presenteeism.

With the aim of creating a comprehensive Well-being Assessment (WBA) that captures multiple domains of well-being, a comprehensive Health Risk Assessment, and productivity, the purpose of this paper is to develop and validate the productivity portion of that assessment. The WBA expands upon the Gallup-Healthways Well-Being Index²¹ to provide more detail about the sources and consequences of differential levels of well-being among individuals in a population, of which productivity is a critical element. Given the demonstrated importance of presenteeism as a business metric and well-being-related sources of this form of productivity loss that are not specifically addressed in existing measurement instruments, there is a need for a more inclusive measure that provides information that can identify the sources of presenteeism and evaluate the impact of well-being-related barriers from one's personal and work life. In capturing the specific barriers that affect performance, such a measure can provide actionable information for improving productivity. For this purpose, we developed the *Well-being Assessment for Productivity* (WBA-P) to measure presenteeism, which we broadly define as decreased job performance due to barriers from personal and work domains of well-being.

METHOD

Instrument Development

The instrument was developed with the goal of creating a well-being based, inclusive assessment of the reasons for productivity loss that can be scored independently of the broader WBA survey,

within which it will be administered. On the basis of a review of literature from a range of disciplines and input from employees working in an organization, 12 common barriers to productivity were identified and served as the question stems for 12 items. These productivity questions ask the frequency which each barrier has impacted an individual's ability to perform his or her best at work over the prior 4 weeks. The validation approach of the productivity measure included evaluation of construct validity, criterion-related validity, and discriminant validity. To provide evidence of construct validity, we correlated the subscales to a well-validated indicator of overall presenteeism (ie, absolute presenteeism from the HPQ),²² and an indicator of health-related presenteeism from the WPAI.⁸ To provide evidence of criterion-related validity of the subscales, we analyzed the strengths of the relationships of the WBA-P scales to self-reported indices of number of chronic health behavior risks, quality of overall health and physical health, and levels of emotional health and life evaluation. This type of analysis has been identified as the most fundamental for best practices for developing measures of productivity.²³ We also analyzed the strength of relationships of the WPAI and the HPQ across these six indices of health and well-being. We expected that each of the four measures would show increased presenteeism with increased well-being indices. All of the instruments were administered via a single assessment to the whole sample.

Sample

Participants were recruited via the Internet through a survey sampling company that has a national pool of 1,500,000 potential participants. This method provided rapid data collection at relatively low cost. A total of 4136 participants were recruited for a clinical trial. Participants then completed the WBA online, which incorporated the productivity items evaluated here and the other measures used in this study. Only individuals who were employed ($n = 1827$) were utilized for this project. The mean age of participants was 47.6 (SD = 11.4). Females made up 56.8% of the sample, which is consistent with our previous research using random digit dialing methods. The sample was predominantly white, non-Hispanic (81.1%) with 9.3% African-American and 3.4% Hispanic. The majority of the sample was married (54.8%), had completed at least some college (71.6%), and had a monthly income of at least \$3000 (53.2%). Eligibility for inclusion in this analysis required the completion of all measures and items listed later. There was no difference in response rates to the individual items as all were completed. At the end of the assessment they were entered into a sweepstakes.

MEASURES

Work Productivity and Activity Impairment Questionnaire: General Health

The WPAI-GH (general health) is a six-item composite of absenteeism (work time missed), presenteeism (impairment at work), work productivity loss (overall work impairment), and activity impairment.⁸ This study focused on the presenteeism item that asks “Think about days you were limited in the amount or kind of work you could do, days you accomplished less than you would like or days you could not do your work as carefully as usual.” Ratings were on a 10-point scale with 0 equaling “health problems had no effect on my work” to 10 “health problems completely prevented one from working.” Scoring of this measure ranged from 0 (no loss) to 100 (complete loss).

Health and Work Performance Questionnaire

The HPQ measures presenteeism as overall job performance. The presenteeism question on the survey that was used in this analysis asks “On a scale from 0 to 10, where 0 is the worst job performance and 10 is the performance of a top worker, how would you rate

your overall job performance on the days you worked in the past 4 weeks (28 days).” Previous studies have shown strong correlations between ratings on this scale to supervisor assessments ($r = 0.52$).²² Scoring of this measure was reverse scored to correspond with the other measures of presenteeism ranging from 0 (best performance) to 100 (worst performance).

Well-Being Assessment for Productivity

Twelve questions assessed reduced functioning related to personal and work well-being domains. The survey asks “During the past 4 weeks (28 days), how often have you had trouble at work concentrating or doing your best because of” each of the 12 different reasons. Possible responses were “not at all,” “some,” or “a lot.” Sequential measurement development described later produced a single hierarchical factor comprising 11 items in two subscales representing work-related (WBA-PW) and personal barriers (WBA-PP) to performance. Scoring of this measure ranges from 0 (not at all) to 100 (a lot for all 11 reasons).

Health Risk Assessment

A general health risk assessment included measures of chronic conditions, overall health, physical and emotional health, and behavior risk factors.²⁴ Participants were assessed on 11 specific chronic conditions and 9 behavior risk factors. Chronic conditions and behavior risks were summed separately and categorized into categories of 0 to 2, 3 to 4, and 5 or more. An individual item assessed perceptions of overall health ranging from poor to excellent. Separate individual items also assessed perceptions of physical and emotional health on a 0 to 10 scale with 0 being the worst health and 10 being the best.

Life Evaluation

The Life Evaluation Index is based on combined responses to ladder ratings from two components of the Cantril Self-Anchoring Striving Scale.²⁵ The Cantril Scale asks individuals to evaluate their lives and imagine a “ladder” with steps numbered from 0 to 10, where “0” represents the worst possible life and “10” represents the best possible life. People classified by Gallup as being in the “thriving” group say that they presently stand on step 7 or higher of the Cantril ladder and expect to stand on step 8 or higher 5 years from now. People classified by Gallup as being in the “suffering” group say they presently stand on steps 0 to 4 of the Cantril ladder and expect to stand on steps 0 to 4 five years from now. Those who are neither “thriving” nor “suffering” are considered to be “struggling.”

Statistical Procedures

The WBA-P was developed using sequential measurement development,²⁶ where the sample was split in two random samples for exploratory factor analysis in one half and confirmatory factor analysis to confirm the factor structure in the second half. Scale means were used to compare the three measures of productivity. To provide evidence of convergent validity, correlations were then used to examine the extent to which these measures capture a similar construct.

To examine evidence of criterion-related validity of the two subscales of the WPA-P (WBA-PP and WBA-PW), multivariate analyses of variance (MANOVA) was used to evaluate the relationships between the four measures of productivity and the following dependent variables: chronic conditions, overall health, physical health, emotional health, number of behavioral risk factors, and life evaluation. Interactions and main effects were examined to understand where differences exist among the productivity measures, as well as across the scores on the six health measures.

RESULTS

Development of the WBA-P

Exploratory factor analysis in the first half of the sample indicated either one or two factors among the 12 items indicating the possibility of two correlated factors. One item was removed because of lack of loading on any factor. The final 11 items were examined in a series of confirmatory factor analyses conducted on the second half of the sample. A hierarchical two-factor model demonstrated good fit ($\chi^2[43] = 544.34$, CFI = 0.91, GFI = 0.95, RMSEA = 0.08) indicating two lower-order factors to a higher-order factor of productivity loss (see Figure 1). The lower-order factors represented individual and work-environment reasons for loss of productivity. Internal consistency was acceptable for the personal subscale (WBA-PP; $\alpha = 0.81$), the work environment subscale (WPA-PW; $\alpha = 0.73$), and the overall WBA-P measure ($\alpha = 0.83$).

PRODUCTIVITY AND HEALTH

Chronic Conditions

A MANOVA detected a significant interaction between presenteeism measures (the HPQ, WPAI and both subscales of the WBA-P) and chronic conditions ($F_{[6,3454]} = 14.80$, $P < 0.001$, $\eta^2 = 0.02$; see Figure 2 and Table 1). Simple effects within each measure of presenteeism show similar patterns for the WPAI ($\eta^2 = 0.09$) and WBA-PP ($\eta^2 = 0.06$), where productivity loss significantly increases as the number of chronic conditions increase. The HPQ ($\eta^2 = 0.01$)

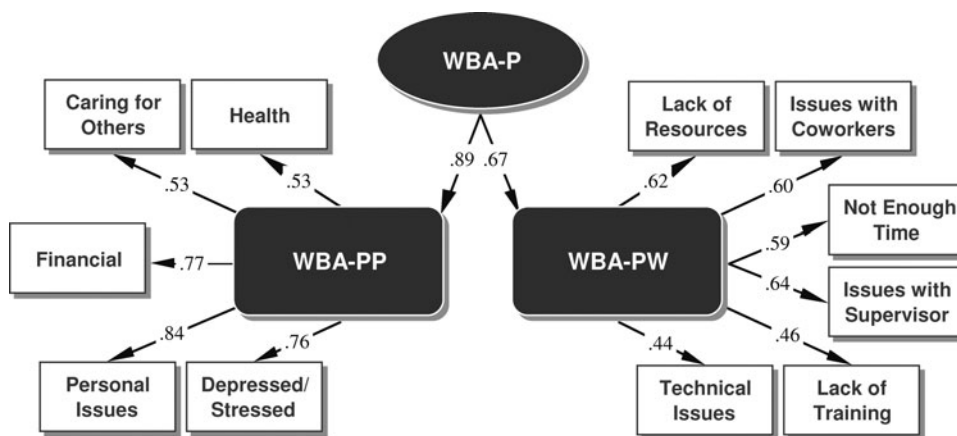


FIGURE 1. WBA-P measurement model. WBA-P indicates well-being assessment for productivity; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related).

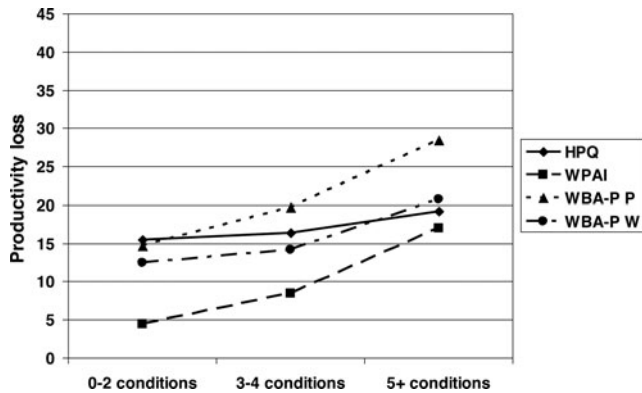


FIGURE 2. Chronic conditions by presenteeism measures. HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

and the WBA-PW ($\eta^2 = 0.04$) show less differentiation across the categories with those with 5 or more conditions having significantly more productivity loss than those with fewer chronic conditions.

Simple effects within condition categories show that the WBA-PP found significantly higher levels of productivity loss than the other three measures across all condition categories, except there was no significant difference with HPQ on 0 to 2 conditions. The WPAI found significantly lower levels than the other three measures across all condition counts, except there was no significant difference from HPQ for participants with 5 or more conditions. The HPQ shows significantly higher productivity loss than the WBA-PW among those with 0 to 2 conditions, and no difference among those with 3–4 conditions and 5 or more conditions.

Overall Health

MANOVA shows a significant interaction between presenteeism measures and overall health ($F_{[12,4564]} = 9.86, P < 0.001, \eta^2 = 0.02$, see Figure 3 and Table 1). All measures showed medium effects within levels of health ($\eta^2 = 0.04$ to 0.12). As reports of health worsened, the amount of productivity loss increased. The WPAI showed significantly lower levels of productivity loss than the HPQ, the WBA-PW and WBA-PP for all levels of health other than poor, where it was only significantly lower than WBA-PP. For the lower levels of health, the WBA-PP was significantly higher than the WBA-PW (poor/fair/good) and the HPQ (poor/fair).

Physical Health

MANOVA shows a significant interaction between physical health and measures of presenteeism ($F_{[18,4874]} = 4.84, P < 0.001, \eta^2 = .02$; see Figure 4 and Table 1). Within each presenteeism measure, there were medium effects ($\eta^2 = 0.05$ to 0.11) where worse physical health was associated with higher levels of presenteeism loss and better physical health was associated with less productivity loss. Within each level of physical health, except 0 to 3, the WPAI was significantly lower than the WBA-PP, the WBA-PW, and the HPQ. At lower levels of physical health, the HPQ (0 to 3, 4, 6) and WBA-PW (0 to 3, 4, 5, 6) were significantly lower than the WBA-PP, but equivalent for those reporting better physical health.

Emotional Health

MANOVA showed a significant interaction between presenteeism measures and levels of emotional health ($F_{[18,4874]} = 19.60, P < 0.001, \eta^2 = 0.06$; see Figure 5 and Table 1). Simple effects within

TABLE 1. Simple Effects Within Measures of Health and Well-Being

	η^2	Significant Differences
Chronic conditions		
0–2	0.158	WPAI < WBA-PW < WBA-PP, HPQ
3–4	0.093	WPAI < WBA-PW, HPQ < WBA-PP
5 or more	0.076	WPAI < WBA-PW < WBA-PP; HPQ < WBA-PP
Behavior risks		
0–2	0.023	WPAI < all
3–4	0.109	WPAI < WBA-PW < HPQ, WBA-PP
5 or more	0.158	WPAI < HPQ, WBA-PW < WBA-PP
Overall health		
Poor	0.03	all < WBA-PP
Fair	0.11	WPAI < HPQ, WBA-PW < WBA-PP
Good	0.14	WPAI < all; WBA-PW < WBA-PP
Very good	0.06	WPAI < all
Excellent	0.01	WPAI < all
Life evaluation		
Suffering	0.06	WPAI < HPQ, WBA-PW < WBA-PP
Struggling	0.22	WPAI < HPQ, WBA-PW < WBA-PP
Thriving	0.06	WPAI < all
Physical health ladder		
0 worst to 3	0.04	all < WBA-PP
4	0.05	WPAI < WBA-PW, HPQ < WBA-PP
5	0.07	WPAI < WBA-PW < HPQ, WBA-PP
6	0.07	WPAI < WBA-PW, HPQ < WBA-PP
7	0.08	WPAI < all
8	0.04	WPAI < all
9 to 10 best	0.01	WPAI < all
Emotional health ladder		
0 worst to 3	0.18	WPAI < HPQ < WBA-PP; WBA-PW < WBA-PP
4	0.07	WPAI < WBA-PW, HPQ < WBA-PP
5	0.08	WPAI < WBA-PW, HPQ < WBA-PP
6	0.06	WPAI < WBA-PW, HPQ < WBA-PP
7	0.06	WPAI < all; WBA-PW < HPQ
8	0.04	WPAI < all; WBA-PP < HPQ, WBA-PW
9 to 10 best	0.02	WPAI < WBA-PW, HPQ; WBA-PP < HPQ

HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

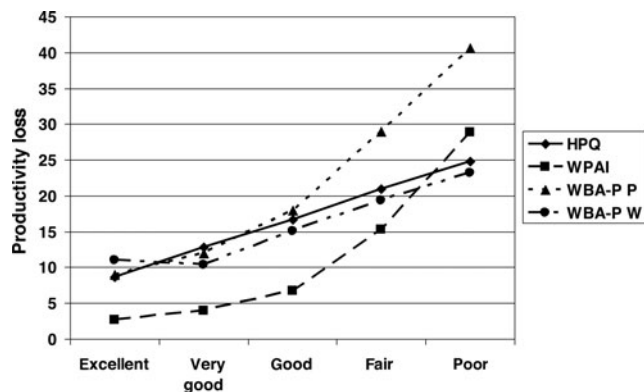


FIGURE 3. Overall health by presenteeism measures. HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

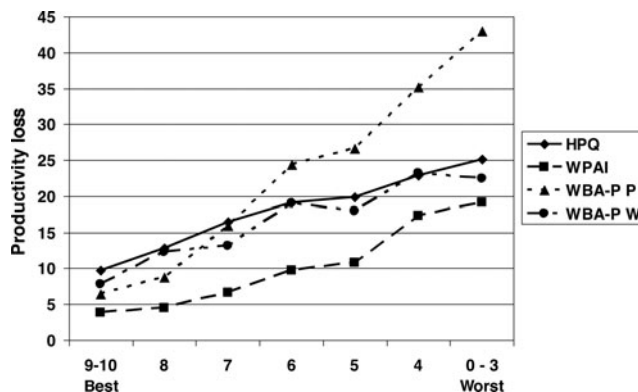


FIGURE 5. Emotional health by presenteeism measures. HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

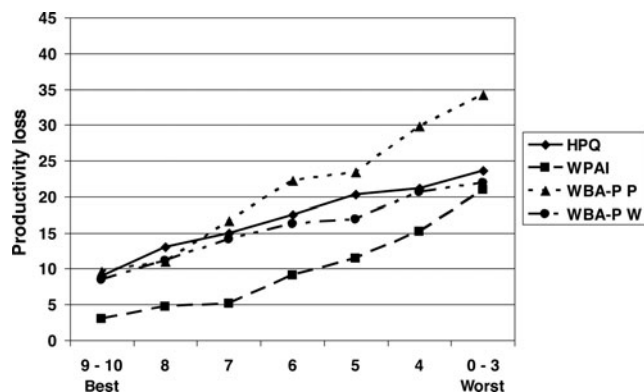


FIGURE 4. Physical health by presenteeism measures. HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

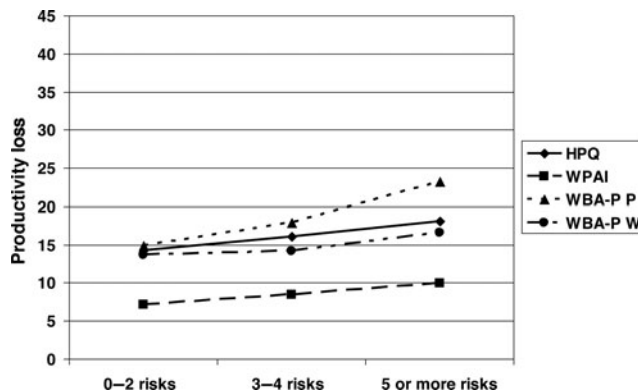


FIGURE 6. Behavior risks by presenteeism measures. HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

each measure of presenteeism showed medium to large effects ($\eta^2 = 0.08$ to 0.30), where more productivity loss was associated with worse emotional health. Simple effects within levels of emotional health showed that the WPAI was significantly lower than the other three measures at all levels of emotional health, except with the WBA-PW at the lowest level of emotional health (0 to 3) and with the WBA-PP at the highest level of emotional health (9 to 10). The WBA-PP was significantly higher than the HPQ and WBA-PW on lower levels (0–3 to 6).

Behavior Risks

MANOVA detected a significant interaction between presenteeism measures and levels of behavior risks ($F_{[6,3454]} = 3.61, P < 0.01, \eta^2 = 0.01$; see Figure 6 and Table 1). Simple effects within HPQ, WBA-PW, and WBA-PP showed small effects ($\eta^2 = 0.003$ to 0.02), where those with 5 or more risks showed significantly more productivity loss than those with fewer behavior risks, except with the WPAI. Simple effects within behavior risk categories show that the WPAI was significantly lower than the HPQ, the WBA-PW, and

the WBA-PP at all risk levels. The WBA-PP was higher than the HPQ and WBA-PW for the higher risk (5 +), and higher than the WBA-PW for the 3 to 4 risk group.

Life Evaluation

A significant interaction was found between life evaluation categories and measures of presenteeism ($F_{[6,3454]} = 22.53, P < 0.001, \eta^2 = 0.04$; see Figure 7 and Table 1). All presenteeism measures showed an increase in productivity loss across each category of thriving, struggling, and suffering. The WBA-PP showed the strongest relationship ($\eta^2 = 0.15$) followed by the HPQ ($\eta^2 = 0.10$), the WBA-PW ($\eta^2 = 0.06$), and the WPAI ($\eta^2 = 0.04$). Within each category of life evaluation, the WPAI found significantly lower levels of productivity loss than the HPQ, the WBA-PW, and the WBA-PP. The HPQ and the WBA-PW showed significantly lower productivity loss than the WBA-PP in both the suffering and struggling categories, but there was no difference in the thriving category.

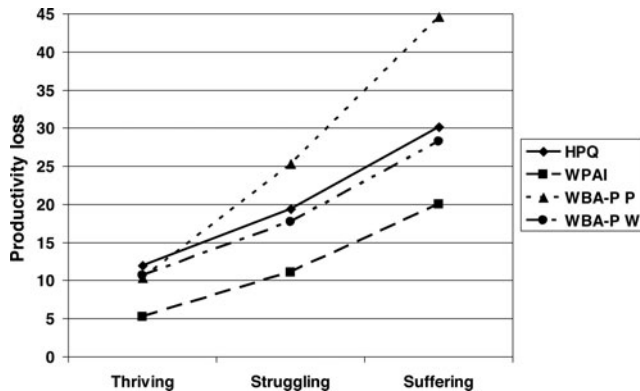


FIGURE 7. Life evaluation by presenteeism measures. HPQ indicates Health and Work Performance Questionnaire; WBA-PP, well-being assessment for productivity (personal barriers); WBA-PW, well-being assessment for productivity (work related); WPAI, Work Productivity and Activity Impairment Questionnaire.

Comparing Measures of Productivity

Correlations between the measures of productivity showed that all measures have similar relationships with one another. The WPAI is correlated at 0.33 with the HPQ and 0.42 with the WBA-P. The HPQ is correlated at 0.36 with WBA-P. The WBA-PP showed similar correlations as the WBA-P with the HPQ (0.37) and the WPAI (.47), while the WBA-PW showed significant but smaller correlations (0.27 and 0.25, respectively).

There was no significant difference between the overall WBA-P ($M = 17.3$, $SD = 17.4$) and the HPQ ($M = 17.2$, $SD = 14.9$; $t_{1731} = 1.19$, $P > 0.05$). Nevertheless, both were significantly higher than the WPAI ($M = 9.5$, $SD = 18.3$; $t_{1731} = 18.50$, $P < 0.001$; $t_{1826} = 16.79$, $P < 0.001$, respectively). Examining the subscales of the WBA-P, the overall WBA-PP ($M = 20.1$, $SD = 22.9$) was significantly higher than all other measures (HPQ: $t_{1762} = 5.99$, $P < 0.001$; WBA-PW: $t_{1731} = 9.30$, $P < 0.001$; WPAI: $t_{1767} = 21.49$, $P < 0.001$). The WBA-PW ($M = 15.4$, $SD = 18.0$) was significantly higher than the WPAI ($t_{1767} = 11.96$, $P < 0.001$) but lower than the HPQ ($t_{1767} = 3.11$, $P < 0.01$). In summary, comparing the subscales, the HPQ and the WPAI, the pattern of significant differences was WPA-PP > HPQ > WBA-PW > WPAI.

Table 1 presents comparisons of these four measures at each level of the six measures of health and well-being for a total of 28 comparisons. When comparing the two subscales, the WBA-PP was significantly higher 19 of 28 times (67.8%). All of these significant differences were at lower levels of health and well-being, and there were no significant differences at better levels. When comparing the WBA-PP and the HPQ, the WBA-PP was significantly greater 13 of 28 times (46.4%). All the significant differences were at lower levels of health and well-being and there were no significant differences at better levels.

When comparing the WBA-PW and the HPQ, there were no significant differences 24 of 28 times (85.7%). When comparing each of these two measures to the WPAI, each was significantly greater than the WPAI 26 of 28 times (93%). The WBA-PP was significantly greater than the WPAI on 27 of the 28 comparisons.

DISCUSSION

The findings presented here indicate that the WBA-P is a valid and reliable measure of presenteeism. Unlike existing measures of presenteeism, the WBA-P captures specific well-being-related performance barriers from a range of sources related to work and per-

sonal life domains. As a whole, these findings provide support for measuring productivity loss using the WBA-P when the goal is to provide a fuller view of presenteeism and specific sources of productivity loss as part of a well-being improvement strategy. The evidence presented herein demonstrate a relationship between presenteeism and indicators of well-being and, therefore, this measure as a part of the WBA is well-aligned with the goals of organizations that aim to improve the well-being of their workforce as a business strategy with measurable outcomes.

The WBA-P captures sources of productivity loss stemming from multiple contributors to an individual's well-being, such as issues with physical and emotional health, home life, and work. A series of exploratory analyses found support for the overall construct validity of the measure. Structurally, findings suggested a hierarchical model with one higher-order factor composed of two lower-order factors reflecting performance barriers from the work domain and issues in more personal, nonwork domains. The full scale and the two subscales all had good internal reliability, indicating that the scale items capture the same constructs. These results indicate that the WBA-P can provide a total score that reflects the higher order construct, and that the subscales can be evaluated separately to produce results that are more highly differentiated from the HPQ and WPAI presenteeism measures.

Evidence of convergent validity was exhibited by the correlation of the WBA-P with existing indicators of presenteeism designed to measure absolute productivity (HPQ item) and health-related productivity loss (WPAI item). The strength of the correlations between these measures was sufficient to conclude that they each captured both common and unique variance in presenteeism. Because presenteeism is a broad construct, perfect correlations were not anticipated, and this is consistent with other studies that have found fairly low correlations among productivity loss instruments. A substantial amount of variance in each measure is unique and should be further examined.

Evidence of criterion-related validity was reflected in the relationships of the WBA-P scales to each of the six indices of health and well-being. The WBA-PP and the WBA-PW both showed that productivity loss increased significantly as the number of chronic conditions and risk behaviors increased, and as overall, physical and emotional health decreased. In addition, both the scales showed an increase in presenteeism across each life-evaluation category of thriving, struggling, and suffering.

Similar relationships were found between the WPAI and the HPQ measures on each of the six indices of health and well-being, with the exception of no significant relationships between the WPAI and number of risk behaviors. Across the four presenteeism measures, the biggest effect sizes were found for emotional health, followed by the life evaluation categories. These results are consistent with studies that find that indices of emotional health, such as depression, stress, and anxiety have some of the strongest relationships to presenteeism.^{27,28} The smallest effect sizes were for the number of behavior risks.

COMPARING THE MEASURES OF PRODUCTIVITY

A comparison of main effects provides insight as to how the measures tested here are similar and different from one another. The HPQ and the WBA-PW may be the most similar measures in that they have the most nonsignificant differences when compared to each other across each level of the six measures of health and well-being. A potential reason for the similarity is that when asked to report on their performance at work compared to a top worker, respondents may focus more on work environment barriers to performance like those assessed in the WBA-PW.

While the WBA-PP and the WPAI differ significantly in their magnitude of presenteeism estimates at 27 of the 28 levels of health and well-being measures, which may stem from the more limited

scope of the WPAI, they were most similar in their pattern of increases in presenteeism estimates from the best levels of physical and emotional health to the worst levels (Figures 2 to 5). The steeper increases of these measures compared to the HPQ and the WBA-PW is further indicated by the larger effect sizes for the WBA-PP and the WPAI on the four measures of physical and emotional health. One plausible explanation for this observation is that the scores of the WBA-PP and the WPAI will be affected to a greater extent by differences in health and well-being, because these two measures assess presenteeism that results from physical health, emotional health and non-work stressors. Of course, this and other hypotheses and interpretations of differences between the presenteeism measures must be tested further in future research.

Differences among the presenteeism measures should be appreciated in light of the fundamental similarity that they all show significant increases in estimates of impaired productivity across six measures of increasing impairment of health and well-being. In addition, differences should not be interpreted to mean that one measure is better than another. Different measures are developed for different purposes, and future research is needed to identify the measure(s) that best serves a given purpose.

We see several specific implications of these new measures for both researchers and for business. With regard to research, the WBA-P can be used at the item, subscale, or full scale level to better understand the dynamics of productivity loss processes. First, at the full scale level, researchers now have a tool that is aligned with the current movement toward a comprehensive view of health and wellness that is exemplified by the goals of Health and Human Services in the "Healthy People 2020" project.²⁹ The use of this holistic measure is well suited to further explore the mechanisms and conditions under which well-being and performance interrelate. Second, given the two subscales of the measure, researchers are able to compare the effects of productivity loss from the work domain versus other personal domains. For instance, health promotion researchers may be interested in examining the extent to which the personal domain subscale predicts outcomes in comparison to the work domain. Lastly, analyses at the item level could help researchers understand the relative impact of specific barriers to performance.

For organizations, research at two levels, the full scale and specific item level, can serve as a diagnostic tool to understand overall productivity loss as well as specific sources of loss across the business, business units, or teams. Group-level results could be used to inform the design of organizational programs, policies, and practices that address a range of barriers. For instance, through the implementation of prevention-focused well-being programs, organizations can ameliorate negative effects of physical and psychological health performance barriers.³⁰ Other research has found support for interventions that prevent or lessen the negative effects of organizational and toxic psychosocial factors in the workplace. To target personal or family issues, programs and tools such as employee assistance programs,³¹ supportive management training,³² and instituting flexible work arrangements³³ are a few examples of ways in which organizations can provide support to individuals experiencing personal stressors. Lastly, research has shown that interventions personalized at the individual-level are more effective than non-tailored programs.³⁴ Therefore, information from individual employee responses could guide or complement telephonic coaching or computer-tailored interventions (CTI) that have been found to be effective for reducing health risk behaviors in health promotion and disease management programs^{35,36} and may also prove effective at increasing performance. Future research will need to demonstrate the benefits of the WBA for diagnostic and intervention purposes.

While the present research contributes new measures with evidence of validity to the existing literature on presenteeism, there are limitations that should be acknowledged and addressed in future research. First, common method bias is a constant concern in research

using only one method of data capture at one time point. In cases where data are self-report, research suggests that links between productivity and well-being may be exaggerated because of a series of potential biases from priming within the survey, implicit theories the participants may hold, or ambiguity in item wording.³⁷ Moreover, various self-serving biases may inflate self-ratings of performance, making them less valid.⁴ Although some work and personal barriers are perceptual and may not be accessible through methods other than self-report, it is important that future research validates the WBA-P against other sources of performance data, such as supervisor ratings and objective productivity measures. Objective indicators of performance may also enhance our understanding of which presenteeism measures provide the most accurate estimate of presenteeism under which conditions.

A final limitation that should be addressed by future studies is that the present sample was limited to individuals with access to the Internet and who are, presumably, computer literate. This may have restricted the range of occupations captured and introduced bias in responses to some performance barrier items (eg, technology barriers). This concern is mitigated somewhat by the fact that the research participants were not from one employer, as has been the case in most presenteeism research. The participants were recruited from a national sample, thus increasing the potential generalizability of the results. Subsequent research should investigate the potential differences in performance barriers across occupational categories, demographic groups, and socioeconomic levels.

Consistent with the movement emphasizing the importance of a broader view of individual health and wellness,³¹ subsequent work should also aim to better understand the mechanisms and dynamics with which well-being and presenteeism interact. Studying the extent to which some barriers are more important than others and the populations in which these effects occur will be critical in developing and testing effective interventions. Assessing the impact of evidence-based interventions designed to reduce presenteeism is ultimately where this research is aimed. Because well-being as captured in the WBA can be compared to the Well-Being Index trends in the community, which have proven to fluctuate in response to external environmental trends,³⁸ measuring productivity simultaneously provides opportunities in the future to understand the relationship of presenteeism to overall well-being and the likely impact of external trends versus employer initiatives. Such research and development can establish an evidence base that supports and advances the well-being movement as a more inclusive approach to improving the health and well-being of individuals, their families, companies, and communities.

From a business perspective, continuing to investigate the reliability and validity of the WBA-P against more objective productivity metrics is the next step toward quantifying the total costs of lost productivity. Accounting for absenteeism and health care costs in addition to presenteeism will be critical in building the business case for well-being programs and other types of intervention. Companies are discovering that the cost savings generated from presenteeism reduction can serve as a competitive advantage in the marketplace.¹¹ In conclusion, the WBA provides organizations information on the overall well-being as well as the impact well-being is having on the productivity of their workforce. This instrument will allow organizations to deliver a single measure that will provide the information needed to guide well-being and performance enhancement programs and to measure their impact on employee productivity.

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