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REVIEW ARTICLE



Flexible work arrangements and employee health: A meta-analytic review

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ABSTRACT

Flexibility regarding where and when work is completed is becoming increasingly available to employees, especially following the COVID-19 outbreak and subsequent shift in the nature of work. There is a plethora of research linking various flexible work arrangements (FWA) to a variety of positive outcomes across domains including reduced work–family conflict, better psychological health, and increased role satisfaction. While several studies have suggested that FWA are related to positive health, others have found no relationship between flexible work arrangements and health outcomes. To clarify these inconsistent findings, the current meta-analytic review ($k = 33$, $n = 90,602$) examines the relationship between flexible work arrangements available to employees and health behaviours and outcomes, specifically physical health, absenteeism, somatic symptoms, and physical activity. Results demonstrate that FWA are associated with better physical health, reduced absenteeism, and fewer somatic symptoms, suggesting that flexible work arrangements can facilitate employees in maintaining their health. There was no association between FWA and physical activity, though these results should be interpreted cautiously given the limited number of primary studies examining this relationship. These findings hold implications for future research and practice, including support for offering individualised flexible work arrangements as means of promoting employee health.

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Exercise; flexible work arrangements; health; meta-analysis; occupational health

Introduction

The prevalence of flexible work arrangements (FWA) has risen sharply over the last decade (Spreitzer et al., 2017) and has experienced an extraordinary spike following the outbreak of the COVID-19 pandemic (Sinclair et al., 2020). While organisations and industries across the globe were already offering a variety of FWA, the COVID-19 pandemic obliged employers to immediately implement FWA for hundreds of millions of workers around the world. With more than one third of Americans currently working from home, and similar effects around the world, understanding the ways in which FWA impact employees' personal and work lives have never been as pertinent as they are during this global transition to a new era of working (Brynjolfsson et al., 2020). While the COVID-19 pandemic may be temporary, many organisations' plans to offer FWA

are not. Major corporations such as Google and Apple have announced that they will offer FWA to employees indefinitely, and numerous organisations have followed suit (e.g. Facebook, Twitter). Given this drastic and sudden change in the nature of work, shedding light on how FWA impact worker health and well-being holds many practical implications for employers and workers alike amidst the development and adjustment of FWA strategies designed to meet individual, organisational, and global needs. Thus, it is imperative to understand both the costs and benefits of this evolving trend across the work and personal domains.

Broadly, FWA can be broken down by *where* (flexplace) and *when* (flextime) one's work is performed (Kossek & Michel, 2011; Rau & Hyland, 2002). More specifically, flextime refers to control over an individual's working hours and includes adjusted start and end times, compressed work weeks, reduced work hours, and ease of taking days off. On the other hand, flexplace refers to policies that enable employees to complete their work from locations outside the physical workplace and includes telecommuting/remote work, working from different company locations, and working from home. Flex-time and flexplace policies are designed to accommodate an individual's specific location or scheduling needs and various forms of FWA can be combined to maximise positive outcomes for both employees and the organisation (Kossek & Michel, 2011). The primary goals of such arrangements are to leave employees with additional time and energy to manage the demands they face across various domains, allow employees across various geographical locations to work together, and, as of more recently, protect the health and safety of workers and their community (Allen et al., 2013; Kelly & Moen, 2007; Sinclair et al., 2020). The current study operationalises FWA as both the use and/or availability of flexplace and/or flextime.

Theoretical background

A combination of resource theories can be used as a framework to explain the relationships between FWA and health-related behaviours and outcomes. The Personal Resource Allocation (PRA) perspective holds that individuals are required to make decisions about how, when, and where to distribute their personal resources when faced with demands in the work and personal domains (Allen et al., 2013; Grawitch et al., 2010). Such personal resources include time, energy (physical, mental, and emotional), and finances, all of which are linked to both individual and organisational outcomes. For example, previous research has found that FWA is linked to positive financial outcomes for organisations as a result of reduced absenteeism, less time taken off work, and fewer days late to work or leaving work early (Halpern, 2005). Similarly, hourly employees can experience personal financial benefits when given access to FWA that allow for adjusting working times or locations around one's individual needs.

The ways in which individuals manage their personal resources determine whether positive or negative outcomes will be experienced. Individual outcomes of resource allocation include future resource levels, health and well-being, and role performance (Grawitch et al., 2010). Positive outcomes emerge when individuals perceive themselves as having enough resources to successfully meet their work and personal life demands and having control over the allocation of resources, while negative outcomes emerge when perceptions of resource sufficiency and control are low (Grawitch et al., 2010).

The relationship between resource allocation and individual outcomes described by the PRA framework is founded in Conservations of Resources (COR) Theory, which holds that stress and strain result from the loss, or threatened loss, of finite resources and that individuals are motivated to protect the resources they have as well as build upon existing resources (Hobfoll, 1989). Once existing resources are depleted, fewer resources remain to dedicate to additional demands in an individual's life, resulting in increased strain and compromised health and well-being. Consequently, in order to preserve health and well-being, it is essential for individuals to find a balance between resource expenditure and acquisition. However, effective management of personal resources varies across individual circumstances, such as having children, work characteristics, and personal characteristics, making a single approach for resource allocation and preservation ineffective for the working population as a whole (Grawitch et al., 2010). In this sense, scheduling flexibility that gives employees control over where, when, or how they perform their jobs can be used to facilitate effective management of personal resources, as flexibility can serve as a source of both resource conservation and control (Allen et al., 2013; Grawitch et al., 2010). FWA have the potential to impact any or all of the resource sources (time, energy, and finances) and therefore are a viable tool for helping employees manage their personal resources and prevent additional stress and subsequent strain (Grawitch et al., 2010).

In line with resource allocation theories, Voydanoff (2004) describes FWA policies as a boundary-spanning resource concerning the interaction between the work and life domains. The availability of FWA facilitates the accomplishment of both work and nonwork responsibilities, primarily through the reduction of time and energy-based demands, leaving individuals with more time, energy, and focus to fulfil demands across domains (Allen et al., 2013; Voydanoff, 2004). Time and energy resources are two primary components of PRA that are directly targeted by FWA, as flexibility facilitates control over time and energy-based resources (Grawitch et al., 2010). Scarcity of time is a key factor worker commonly attribute to a lack of physical activity, healthy diet, sleep quality, and a host of other health-related behaviours (Mailey et al., 2014; Persson & Martensson, 2006). Hence, FWA can contribute to improved health by providing individuals more time to engage in healthy behaviours, such as exercising or preparing meals (Grzywacz et al., 2007; Moen et al., 2013a). Regarding energies, increased control over when, where, and how work-related tasks are completed allows for more personalised and efficient energy-based resource allocation as a function of personal preferences based on specific needs (e.g. individual differences and characteristics; Grawitch et al., 2010). Given that a key goal of FWA policies is to allow individuals to allocate their time in such a way that best facilitates the completion of responsibilities across all of their roles, including roles outside of work, employees should have more time to engage in health-sustaining behaviours. While there are several domain-specific goals associated with access to FWA, it is not yet abundantly clear if these goals are being achieved through the availability and use of FWA. A meta-analytic understanding of the health-related outcomes of FWA will help shed light on the role of FWA in supporting employee health and well-being and can help maximise the individual and organisational utility of FWA policies.

FWA and physical health

Over the last decade, FWA policies have begun to be endorsed by organisations as a health promotion tool. Organisations worldwide are highlighting the importance of offering and utilising FWA policies in fostering overall employee health and are implementing policies and procedures that demonstrate an organisational culture supportive of these goals (Allen, 2002; Stokols et al., 1996). With the recent surge in the prevalence of FWA following the COVID-19 outbreak, understanding the benefits and limitations of such non-traditional working arrangements is paramount as more and more workers gain the option of utilising flextime and flexplace policies.

Reinforced by resource theories and perspectives, FWA has been linked to a host of work, family, and personal outcomes. Within the personal domain, FWA has been associated with a variety of health-related outcomes including sleeping habits, psychological health, somatic symptoms, absenteeism, exercise, and physical health (e.g. Carlson et al., 2011; Deery et al., 2017; Pedersen, 2014; Tucker & Rutherford, 2005). However, findings regarding the relationship between FWA and health-related outcomes are rather inconsistent (e.g. Faurote, 2015; Moen et al., 2013b; Wilson et al., 2004). While some studies have suggested that FWA are related to positive health outcomes (e.g. Pagnan et al., 2017; Treiber & Davis, 2012), other studies have found no relationship between FWA and health-related outcomes (e.g. Faurote, 2015; Jang, 2009). For example, Haley and Miller (2015) observed a positive relationship between perceived flexibility and physical health while Jones and coauthors (2008) found no association between perceived FWA and health when investigating this relationship. Given the lack of clarity surrounding the relationships between FWA and physical health, the present study concentrates on the physical health-related behaviours and outcomes associated with FWA.

The health-related variables of interest in the current study include general physical health, absenteeism, somatic symptoms, and physical activity. Absenteeism, somatic symptoms, and physical activity are included in addition to general physical health given their representation of overall physical health (Hyphantis et al., 2013; Merrill et al., 2013; Powell et al., 2011). *General Physical Health* refers to objective and subjective measures of physical health, including single and multiple items self-report measures of physical health along with objective measures of physical health, such as cardiovascular health. Given the notion that FWA frees up additional resources for employees to meet intra-domain demands and reduce stress, it is anticipated that FWA is related to better physical health. *Absenteeism*, operationalised as the frequency of missed days of work over a particular span of time, is indicative of physical health in that individuals with compromised health tend to exhibit more absenteeism in the form of sick days (Merrill et al., 2013). Therefore, it is expected that FWA are associated with lower rates of absenteeism, given that a goal of FWA policies is to facilitate employee health and well-being. *Somatic Symptoms* refer to the presence of various physical symptoms or complaints that can impair functioning and are associated with diminished physical health (Hyphantis et al., 2013). Somatic symptoms include stomach pain, headaches, back and neck pain, dizziness, tightness of chest, congestion, muscle soreness, along with numerous other physical manifestations. Given the relationship between somatic symptoms and physical health, it is expected that FWA is associated with fewer

somatic symptoms. Participation in *Physical Activity* is directly related to physical health and well-being, in that more engagement in exercise is associated with better physical health (Powell et al., 2011). The present study operationalises physical activity as a number of days in a typical week that employees participate in moderate to strenuous exercise including cardiovascular exercise, strength exercise, and yoga. Again, given that one of the functions of FWA is to increase employee resources, such as time, to engage in health-sustaining behaviours, it is expected that FWA is associated with increased physical activity. Drawing from PRA and COR theories and the above operationalizations of health-related variables, it is predicted that FWA will be associated with positive health-related behaviours and outcomes in the following ways:

Hypothesis 1: FWA are associated with increased physical health.

Hypothesis 2: FWA are associated with decreased absenteeism.

Hypothesis 3: FWA are associated with decreased somatic symptoms.

Hypothesis 4: FWA are associated with increased physical activity.

Moderators of FWA on health

In synthesising findings exploring the relationships between FWA and health, discrepancies in the extant literature need to be addressed, as they create an incomplete representation of how FWA initiatives influence employee health behaviours and outcomes. Such inconsistencies could be a result of differing effects of FWA on individuals regarding the depletion of time and energy-based resources based on the form of flexibility. It has been observed that different forms of FWA can result in varying outcomes, as different types of FWA influence resource allocation uniquely (Halpern, 2005; Kossek & Michel, 2011). For example, while FWA is intended to facilitate resource management, McKeever (2020) observed that working from home, a form of flexplace, following the COVID-19 outbreak led some individuals to work longer hours than they previously had been, resulting in further depletion of time and energies. Such effects have also been observed before the pandemic impacted the nature of work (e.g. Lautsch et al., 2009). In relation to the work-life interface, Shockley and Allen (2007) found that flextime is more strongly associated with reduced work-to-family conflict than is flexplace. Regarding the work domain, Halpern (2005) found that flextime policies are particularly associated with lower absenteeism and fewer missed deadlines. Within the personal domain, Haley and Miller (2015) observed that short-notice forms of flexibility, such as the ease of taking time off for illness or other personal matters, significantly improved sleep difficulties, while compressed work weeks showed no improvements to sleep quality. These findings across domains highlight the importance of studying FWA based on the form they take, as the type of flexibility utilised influences the effectiveness of the FWA for various work, family, and personal outcomes. However, it is not yet understood how the various forms of FWA uniquely relate to health outcomes; thus, a goal of the present study is to explore the differential effects of flextime versus flexplace on health-related outcomes.

Hypothesis 5: Type of flexibility (flextime versus flexplace) moderates the relationship between FWA and health/physical activity/absenteeism/somatic symptoms.

Another explanation for the inconsistency in findings could be the ways in which employees are utilising FWA policies. Different utilizations of FWA have unique relationships with personal and work outcomes. There is evidence to suggest that the

use versus availability of FWA moderates the relationship between FWA and several associated consequences (Shockley & Allen, 2007). One explanation for these differential effects is that there is a pervasive stigma associated with the utilisation of FWA that can dissuade workers who would benefit from FWA from using them or create psychological distress for those who choose to utilise FWA, especially if the organisation does not create a supportive environment that encourages and supports the utilisation of available FWA policies (Kossek & Michel, 2011). As a result, using FWA can inadvertently result in negative individual and organisational outcomes, such as reduced psychological well-being, boundary management, and productivity. Thus, it is vital to understand the differing effects of flexibility availability versus actual utilisation when exploring the various outcomes of FWA. Thus, another objective of the present study is to evaluate the effects of FWA use and availability on health-related behaviours and outcomes.

Hypothesis 6: FWA availability versus FWA use moderates the relationship between FWA and physical health/physical activity/absenteeism/somatic symptoms.

The present study

Over the last decade, flexible work arrangements have gained significant traction as a tool for helping employees meet work and personal demands; however, inconsistencies in the extant literature provide an unclear picture of the relationship between FWA and employee health. Given the recent necessitated, widespread implementation of FWA around the globe, it is essential to understand the ways in which FWA impact employee health and well-being. This understanding sets the framework for developing FWA policies and strategies that ensure the desired outcomes are being achieved through the use and availability of FWA. The primary foci of the present meta-analytic review are to reconcile existing findings by creating a more holistic picture of how FWA are related to health-related behaviours and outcomes and to explore attributes of FWA policies that moderate the relationship between FWA and health. Based on the presented theory and research, the current study assesses the relationships between FWA and the health-related outcomes of general physical health, absenteeism, somatic symptoms, and physical activity. In addition, the moderating effects of type of flexibility (flextime versus flexplace) and FWA use versus availability will be explored.

Method

Literature search and inclusion criteria

In search of papers capturing the relationship between FWA and physical health-related behaviours and outcomes, the authors conducted a series of computer-based literature searches on the databases *Academic Search Premier*, *Alt HealthWatch*, *APA PsycArticles*, *Business Source Ultimate*, *CINAHL*, *Dissertation Abstracts*, *ERIC*, *Google Scholar*, *Health Source*, *PsycINFO*, *PubMed*, and *Web of Science*. The following key term combinations were used in conducting the literature searches: “flexible work arrangements,” “scheduling flexibility,” “schedule control,” “flextime,” or “compressed work week” in combination with “physical health,” “general health,” “health behaviours,” “diet,” “exercise,” “physical activity,” “alcohol,” “absenteeism,” “obesity,” “somatic symptoms,” “sleep,”

“headache,” “back pain,” “neck pain,” “stomach ache,” or “fatigue.” Specifically, in order to ensure that all available studies were retrieved, key terms were combined two at a time, pairing each predictor (e.g. flexible work arrangements) with every outcome (e.g. physical health) in a separate search within every database. In addition, a variety of health-related behaviours aside from exercise were included to ensure that our search encompassed all potentially relevant studies. All journal articles, theses, dissertations, and book chapters through July 2020 that appeared in the searches were pulled into the reference management software, Zotero, for further evaluation. Searches were not restricted to a specific time-period (e.g. studies published after 2000), thus all studies published through July 2020 were considered for inclusion. Articles that the authors could not access were retrieved by a professional librarian through interlibrary loans. To broaden the search beyond pulling from databases, the authors cross-referenced the references of relevant studies in search of additional applicable papers. In addition, upon coming across a relevant study, the authors examined the publications of the first and second authors of the identified paper in search of additional relevant papers.

A total of 5207 sources were pulled across databases ($k = 5176$) and additional records were identified through other sources ($k = 31$). Inclusion criteria for the study comprised of three requirements: a measure of FWA that meets the current operationalisation, a measure of at least one of the health-related criteria being investigated that meets the current operationalisation, and the associated correlation or values that could be converted into a correlation. Examples of values that can be converted into a correlation include means and standard deviations between groups, independent and dependent *t*-tests, chi-square, and one-way ANOVA. Studies were excluded if they: (1) were not available in English (2) did not contain a measure of FWA and at least one of the outlined outcome variables; (3) included metrics that could not be converted to a zero-order correlation; (4) operationalised health as any form other than physical health (e.g. psychological health); (5) did not operationalise outcomes variables in line with the present operationalisation. Figure A1 in the Appendix shows a flowchart of the study identification, inclusion, and exclusion process. All studies that met the inclusion criteria were double coded by trained coders, with 84% agreement. Discrepancies in coding were reviewed and discussed until a consensus was reached. As outlined in the PRISMA flow diagram in Figure A1 (Moher et al., 2015), there were a plethora of studies relevant to the subject; however, many of these studies were qualitative or reported statistics that could not be converted to zero-order correlations. While these studies could not be included in the meta-analytic calculations, several were used to help develop theoretical support and hypotheses for the present study. Ultimately, there were 33 studies that met the inclusion criteria for the present study, yielding a total of 44 effects sizes; several studies were included in multiple bivariate relationships since they measured more than one outcome of interest. These 33 studies include 30 published journal articles and three dissertations.

Coding

The following information was collected from each of the articles included in the present analyses: (a) publication status (dissertation, peer-reviewed article), (b) occupations of participants within each sample, (c) nation in which the data were collected, (d)

gender distribution of the sample, (e) whether the measure of flexibility represented flextime, flexplace, or both, (f) whether the measure of flexibility referred to FWA use or FWA availability, (g) scales used to measure variables of interest, (h) internal consistency or reliability for all variables of interest, and (i) bivariate correlations representing the relationships of interest.

For the two studies that comprised of multiple time points using the same sample (Butler et al., 2009; Faurote, 2015), only correlations and sample sizes from Time 1 were included.¹ Additionally, if a study captured several components of FWA or physical health separately (e.g. Haley & Miller, 2015; Pedersen, 2014), both individual correlations and composite correlations along with Mosier reliabilities were created using methods outlined in Schmidt and Hunter (2014) to examine overall and subgroup relationships. Finally, because a high proportion of studies that met the inclusion criteria came from potentially overlapping samples (e.g. 2008 National Study of the Changing Workforce), the study with the largest samples size was chosen to represent the recurrent sample in order uphold the assumption of independence. For studies that used the same sample but captured different populations within the sample (e.g. part-time workers versus only Hispanic workers), both studies were included in the final sample.

Meta-analytic techniques

Schmidt and Hunter's (2014) meta-analytic procedures were used to carry out the present analyses. All analyses were carried out in Wiernik's (2017) Open Psychometric Meta-Analysis spreadsheet developed to conduct psychometric meta-analytic procedures following Schmidt and Hunter's (2014) random-effects methodology. Non-correlational statistics (e.g. means and standard deviations, chi squared statistics, *t*-tests, etc.) that could be transformed into zero-order correlations were converted so all data were in a comparable metric. Each correlation represents the strength and direction of the relationship between the degree of FWA and the health-related outcome. Unfortunately, there were 55 relevant studies that did not report statistics that could be converted to correlations, reported only qualitative data, were not available in English, or did not operationalise relevant variables according to the current inclusion criteria, resulting in a number of applicable primary studies that could not be included in the present study. Authors of papers that did not report correlations were contacted via email and were requested to share the correlations from their study (reported and converted composite correlations and reliabilities can be found in the Appendix).

Meta-analytic correlations for each relationship of interest were calculated, weighing primary study correlations (*r*) based on samples size (*n*) to correct for sampling error. In our reporting of the results, *k* refers to the number of samples included in a meta-analytic relationship, *n* consists of the number of participants in each meta-analytic relationship, and *r* represents the sample size weighted mean observed meta-analytic correlation between FWA and each outcome. Confidence intervals (95%) of *r* were calculated to test for statistical significance at the *p* < .05 level. Mean correlation coefficients were also corrected for unreliability in the predictor and criterion; in essence, this corrected correlation or rho ($\rho = r$ corrected for unreliability in the predictor and criterion) is the observed or uncorrected correlation divided by the square root of the multiplicative reliabilities ($r_{xy}/\sqrt{(r_{xx} \times r_{yy})}$). Because it is common to use single-item measures of

health-related variables and FWA, many of the measures included did not have a reliability value. Therefore, artefact distributions of variables from all studies included in the meta-analysis were used to make unreliability corrections using the equation above (Schmidt & Hunter, 2014). Since absenteeism was operationalised in terms of days of work missed, it can be assumed that this variable was measured without error and was treated as having perfect reliability. Finally, the standard deviation of rho ($SD\ \rho$), 80% credibility interval of rho (80% CV), and the percentage of variance in effect sizes that was accounted for by statistical artefacts and sampling error (% Variance) are all reported to display the precision of rho. High dispersion of rho, as indicated by large standard deviations and wide credibility intervals, suggest the presence of moderators, as do low levels of variance in effect sizes that were accounted for by statistical artefacts and sampling error.

Regarding moderation analysis, the minimum number of studies deemed necessary to provide sufficient information to test for moderation is variable throughout the literature; however, there is general support for setting this cutoff at 10 studies for the overall bivariate relationship (e.g. Allen et al., 2012; Michel et al., 2011). Therefore, relationships required at least 10 independent samples in order to explore the proposed subgroup or moderation effects. Moderation testing was conducted using subgroup analysis and associated Q statistics, specifically the Q_b or chi-square test for heterogeneity between groups, and Q_w or chi-square test for heterogeneity within group. Considering Q_b examines the homogeneity of effect sizes across groups, a statistically significant Q_b indicates a significant impact of a moderator on the variance across groups, while the Q_w tests for the corresponding homogeneity of effect sizes within each group. Finally, we also report the I^2 statistic, which describes the percentage of variation across studies that is due to heterogeneity rather than chance (Higgins et al., 2003; Higgins & Thompson, 2002).

Results

Main effects between FWA and physical health, absenteeism, somatic symptoms, and exercise outcomes are reported in Table 1 (Hypotheses 1–4), while the moderating effects of FWA availability versus use and flextime versus flexplace are reported in Tables 2 and 3 (Hypotheses 5 and 6). Prior to hypothesis testing, we examined potential publication bias in our study relationships. Publication bias analyses were conducted by assessing differences based on publication status for each of the relationships examined. Results of these analyses suggest that there are no differences in effect sizes between published and unpublished research regarding FWA and physical health ($Q_b = 1.33$, $p = .25$).

Table 1. Effects of scheduling flexibility on health-related outcomes.

Variable	k	N	r	95% CI	p	$SD\ p$	80% CV	% Variance
Physical Health	23	23,290	.13	.11, .15	.16	.05	.09, .23	34
Absenteeism	6	35,958	-.07	-.10, -.05	-.08	.03	-.12, -.05	24
Somatic Symptoms	10	36,966	-.10	-.13, -.08	-.12	.04	-.17, -.07	21
Exercise	5	1,974	.03	-.04, .10	.04	.07	-.06, .13	37

Notes: Higher values indicate higher levels of the construct. k : number of samples. N : number of participants. r : sample size weighted mean observed validity. CI: confidence interval of r . p : r corrected for unreliability in the predictor and criterion. $SD\ p$: standard deviation of p . CV: credibility interval of p . % Variance: the percentage of variance in effect sizes that was accounted for by statistical artifacts and sampling error.

Table 2. Moderating effects of form of flexibility on health-related outcomes.

Outcomes	<i>k</i>	<i>N</i>	<i>r</i>	95% CI	<i>Q_b</i>	<i>Q_w</i>	<i>I</i> ²
Physical Health					1.25		
Flexitime	10	10,703	.11	.08, .13		17.93*	49.81
Flexplace	3	2,313	.08	.00, .16		11.57**	82.72
General	14	12,398	.11	.08, .14		47.08***	72.39
Somatic Symptoms					10.12**		
Flexitime	2	1,871	-.17	-.19, -.15		.44	0.00
Flexplace	0	–	–	–	–	–	–
General	9	34,811	-.10	-.12, -.08		36.22***	77.91

Notes: Higher values indicate higher levels of the construct. *k*: number of samples. *N*: number of participants. *r*: sample size weighted mean observed validity. CI: confidence interval of *r*. *Q_b*: chi-square test for heterogeneity between groups, *Q_w*: chi-square test for heterogeneity within group, *I*²: percentage of the total variability due to true heterogeneity.

Table 3. Moderating effects of flexibility use versus availability on health-related outcomes.

Outcomes	<i>k</i>	<i>N</i>	<i>r</i>	95% CI	<i>Q_b</i>	<i>Q_w</i>	<i>I</i> ²
Physical Health					4.16*		
Use	4	1747	.06	-.06, .17		24.86***	87.93
Availability	24	24,473	.11	.09, .13		48.91**	52.98

Notes: Higher values indicate higher levels of the construct. *k*: number of samples. *N*: number of participants. *r*: sample size weighted mean observed validity. CI: confidence interval of *r*. *Q_b*: chi-square test for heterogeneity between groups, *Q_w*: chi-square test for heterogeneity within group, *I*²: percentage of the total variability due to true heterogeneity.

or FWA and physical activity ($Q_b = 0.15$, $p = .69$). Meanwhile, there were no unpublished studies included for absenteeism and somatic symptoms, thus these relationships could not be examined for publication bias.

Main effects

Hypothesis 1 proposed that FWA are associated with better physical health. The results, which include data from 23 samples ($n = 23,290$), suggest that there is a small positive association between having a higher degree of flexibility and physical health ($\rho = .16$, $SD \rho = .05$). While this correlation is considered weak according to the generally accepted magnitudes assigned to correlations, as determined by Cohen (1988), its significance as indicated by a 95% confidence interval (CI) of *r* that excludes zero suggests that FWA may be meaningfully related to employee health. Overall, 34% of the variance in this effect size is explained by sampling error and statistical artefacts (i.e. unreliability in the measurement of FWA and physical health). This low percentage of variance explained and the moderately wide credibility interval (80% CV = .09, .23) suggest that moderators are likely acting on the relationship between FWA and physical health (Geyskens et al., 2009; Schmidt & Hunter, 2014).

Hypothesis 2 examined the relationship between FWA and absenteeism. The results, which include data from six samples ($n = 35,958$), yielded a statistically significant relationship between flexibility and absenteeism ($\rho = -.08$, $SD \rho = .03$) where FWA is associated with fewer missed days of work. Additionally, the large variability in corrected effect sizes resulted in a relatively wide 80% CV (-.12, -.05) and a small percent variance explained by sampling error and statistical artefacts (24%), indicating that moderators are likely acting on this relationship. However, with only six effect sizes included in the analysis of this relationship and a large effect size outlier, these findings should be

interpreted cautiously. More research exploring the relationship between FWA and absenteeism is needed in order to make substantive conclusions about the association between these constructs.

Hypothesis 3 proposed that FWA are related to decreased somatic symptoms. The results, which include data from 10 samples ($n = 36,966$), yielded a small negative relationship between flexibility and somatic complaints ($\rho = -.12$, $SD \rho = .04$) where FWA are related to reporting fewer somatic complaints. Additionally, the moderate variability in corrected effect sizes resulted in a wide 80% CV ($-.17$, $-.07$) and a small percent variance explained by sampling error and statistical artefacts (21%), suggesting that moderators are likely acting on this relationship.

Hypothesis 4 addressed the relationship between FWA and participation in physical activity. The results, which include data from five samples ($n = 1974$), yielded a non-significant relationship between flexibility and physical activity ($\rho = .04$, $SD \rho = .07$). Additionally, the large variability in corrected effect sizes resulted in a wide 80% CV ($-.06$, $.13$) and a small percent variance explained by sampling error and statistical artefacts (37%), suggesting that moderators are likely acting on this relationship. However, with only five effect sizes included in the analysis of this relationship, these findings should be interpreted cautiously. More research exploring the relationship between FWA and physical activity is needed in order to make conclusions about the association between these constructs.

Moderator effects

Hypothesis 5 predicted that the type of flexibility (flextime versus flexplace) moderates the relationship between FWA and health-related outcomes. In testing this hypothesis, a third category of flexibility was also created that encompassed studies that did not differentiate between flextime and flexplace and represents both forms of flexibility. The results of these moderation analyses indicate that the form of flexibility does not moderate the relationship between FWA and physical health with a nonsignificant chi-square test for heterogeneity between groups ($Q_b = 1.25$, $p = .53$); however, there was a significant moderating effect of FWA type on somatic symptoms ($Q_b = 10.12$, $p = .00$). These findings suggest that while the type of flexibility might not be differentially related to general physical health, flextime and flexplace do have differing relationships with the experience of somatic symptoms. Specifically, flextime was associated with experiencing less somatic symptoms than general flexible practices; however, this subsample was small and should be interpreted with some caution. Meanwhile, the moderating effect of FWA type on absenteeism and exercise could not be tested in the present study, as there were insufficient studies to run moderation analyses.

Hypothesis 6 predicted that FWA use versus FWA availability moderates the relationship between FWA and health-related outcomes. Unfortunately, because there were very few samples that assessed FWA utilisation, moderation analyses could only be run for the bivariate relationship between FWA and physical health. The results suggest that use versus availability of FWA significantly moderates the relationship between FWA and physical health ($Q_b = 4.16$, $p = .04$), with availability resulting in a stronger positive relationship with general physical health than use.

Discussion

The objective of the present study was to provide a comprehensive review of the literature exploring the relationships between flexible work arrangements and health-related outcomes. The results of the present meta-analytic review suggest that there is a small positive association between having access to FWA and physical health and a small negative association between FWA and absenteeism and the presence of somatic symptoms. Given that a major objective of FWA is to allow for workers to allocate their finite personal resources in a way that allows for them to meet the responsibilities of the various roles they hold, having a flexible schedule should leave individuals with more time, energy, and finances to engage in health-promoting activities and experience less stress. With small yet significant relationships between FWA and better physical health, reduced absenteeism, and fewer somatic symptoms, the findings of the current meta-analysis provide support for this notion and the endorsement of FWA as a means for facilitating employee health and well-being.

Additionally, while FWA was hypothesised to be positively associated with health-promoting behaviours, such as engaging in physical activity, the association between flexibility and physical activity was nonsignificant. This finding suggests that having FWA might not facilitate participating in exercise; however, because there were only five samples exploring this relationship included in the present study, with a large amount of variability, the conclusion that FWA is not associated with physical activity cannot be conclusively drawn. A potential explanation for the observed inconsistency in findings regarding the relationship between FWA and exercise could be the occurrence of unanticipated consequences of FWA that can arise. It has been observed that employees with FWA can experience work intensification in where they exert more time or energy into their work in an effort to return the favour of having access to FWA (Kelliher & Anderson, 2010). In this sense, FWA could be leading some individuals to work additional hours or exert additional effort into their jobs, leaving them with fewer personal resources to engage in health-sustaining behaviours such as physical activity. The results of the current analysis highlight the need for additional research exploring the relationship between FWA and engagement in health-related behaviours, especially as the rates of FWA continue to rise following the COVID-19 pandemic.

Given the rather wide 80% credibility intervals and low percentages of variance accounted for by statistical artefacts and sampling error for each of the resulting average effect sizes, the moderating effects of FWA use versus FWA availability and the type of flexibility (flextime versus flexplace) were explored. Given the limited sample size of the physical activity and absenteeism samples, moderation effects could only be tested on the physical health and somatic symptoms outcomes.

It was observed that flexibility use versus availability significantly moderates the relationship between FWA and physical health outcomes, in that flexibility access was associated with greater physical health than flexibility use. This finding is consistent with the existing literature that suggests that flexibility use may not yield intended outcomes if the work environment is not supportive of the use of available FWA (Shockley & Allen, 2007). For example, without proper support from supervisors, coworkers, and the organisation, employees may experience negative career outcomes, hostile behaviours or attitudes from organisational members, and may feel that it is inappropriate to utilise

available FWA. Such sentiments can minimise the effectiveness of FWA policies and can result in counter-productive outcomes for both the organisation and the individual. It remains unclear whether FWA use versus availability moderates the relationship between FWA and somatic symptoms. Given the lack of studies assessing flexibility use in the somatic symptoms sample, moderation effects could not be assessed for this relationship.

Type of flexibility (flextime versus flexplace) significantly moderated the relationship between FWA and somatic symptoms, in that flextime was related to reporting fewer somatic symptoms than general flexible practices, but not the relationship between FWA and physical health. This finding suggests that the form of flexibility available may not differentially affect physical health outcomes, especially if individuals are able to choose FWA that are best suited to meet their individual needs. However, these results should be interpreted with caution, as these moderation effects were tested on a small sample size with few samples that included measures of flexplace. The present findings highlight the need for more research that distinguishes between the form of flexibility used or available when exploring the relationships between FWA and physical health outcomes. There is an especially large necessity for research assessing the effects of flexplace on physical health, as there were only three such studies available in the present analysis. With the recent global shift to telecommuting following the COVID-19 outbreak, millions of workers have transitioned to primarily working from home and many will continue to do so indefinitely, making it ever more vital to understand the ways in which flexplace-based forms of FWA impact health-related outcomes.

Implications for research and practice

As the prominence of and demand for FWA continue to grow worldwide, it is crucial to understand work, family, and health-related domain outcomes that come as a result of these changes to work schedules and dynamics. The results of the present study hold several implications for research and practice. With poor physical health being an escalating global concern, identifying occupational factors that sustain and promote employee health and well-being is essential in addressing this issue. The findings that FWA are associated with better physical health, less absenteeism, and fewer somatic symptoms suggest that, when applied appropriately, FWA can help facilitate worker health, which has important implications for individuals and organisations alike. Employers should offer some level of flexibility to employees when possible as a way to support their health and well-being, especially given the recent increased concern with physical health following the COVID-19 pandemic. Given the wide variety of flexibility options, including telecommuting, compressed work weeks, reduced working hours, access to days off, and so on, flexibly options that best suit both the individual's and the organisation's needs can be reasonably agreed upon in many cases. Because the relationship between FWA and health is relatively small in magnitude, it is important to note that FWA are only a piece of the puzzle in restoring, supporting, and promoting worker health and well-being and should be used in conjunction with additional programmes and opportunities geared toward sustainable health and well-being. Nevertheless, even small effects hold meaningful practical implications for organisations and individuals, particularly for critical outcomes such as employee health.

The finding that there was no difference in effect sizes for physical health between studies that captured flextime, flexplace, or a combination of both suggests that there is not a superior form of flexibility when it comes to physical health outcomes, but rather outcomes may depend upon whether individuals have access to or use FWA that fit their individual needs. Moreover, the finding that FWA availability is associated with better physical health than FWA use suggests that more care needs to be taken in helping workers identify FWA opportunities that best suit their needs and supporting the use of FWA at all levels of organisations. FWA fit and support are especially important factors of success as the nature of work continues to evolve following the COVID-19 pandemic. The modern era of work has more FWA use and availability than ever before and positive individual and organisational benefits can be seen if proper support is provided for employees as they choose whether, how, and when to utilise FWA.

Limitations

Based on the current state of the literature investigating the relationships between FWA and health-related behaviours and outcomes, there are several limitations that should be considered when interpreting the results of the present study. First, while there was no support for the relationship between FWA and physical activity, only five studies measuring this relationship met the inclusion criteria for the present study. The diminutive sample available to explore the relationship between FWA and physical activity indicates that the present results may not be representative of the true relationship between flexibility and physical activity. Until there is more research investigating these relationships, it will be difficult to gain an accurate understanding of the way FWA influences participation in physical activity.

Another limitation of the present study was that moderation analysis could not be performed on the relationships between FWA and physical activity and absenteeism. Although less than half of the variance in the prediction was explained in each of these outcomes, suggesting that moderators might play a role in this relationship, there were less than 10 independent samples included in the present analyses for these outcomes. Given that the minimum number of studies deemed necessary to provide sufficient information to test for moderation was set to 10, relevant moderators acting on this relationship could not be explored. This limitation highlights the pressing need for more primary studies examining the association between FWA and health-related behaviours and outcomes.

A third limitation of the present study was the lack of representation of or distinction between different features of FWA that could be differentially associated with health-related outcomes. While there is ample support for certain features of flexibility being important in determining the outcomes of flexibility, such as the form of flexibility or whether it is utilised or available, very few primary studies identified in the present meta-analysis distinguished between flextime versus flexplace, making it difficult to parse out the effects of each type of flexibility. The majority of studies that did differentiate between flextime and flexplace captured only flextime, with only three studies in the present analysis that capture flexplace. There is a large need for more primary studies investigating the health-related outcomes associated with flexplace-based FWA. Additionally, only four studies included in the present review investigated flexibility

use, while 24 examined perceptions of flexibility availability. Additional research comparing the effects of flexibility use versus availability is needed in order to gain a clearer understanding of the differential effects of perceived flexibility compared to utilised FWA. In particular, there is a dire need more for more primary studies assessing the effects of flexibility use.

Future research directions

There are several concerns regarding the quality and quantity of existing research assessing the relationships between FWA and health behaviours and outcomes that need to be addressed in order to gain a more accurate understanding of these relationships. A concern that became evident throughout the process of conducting this meta-analysis is the dearth of existing research that explores the relationships between FWA and various health-related behaviours and outcomes. Future research should employ more multi-wave and longitudinal assessments of these relationships, as most of the existing research was conducted with cross-sectional, archival data that did not differentiate between differing forms or utilizations of flexibility. These studies should break down flexibility into its different forms, as it has been observed that different forms and utilizations of FWA often result in unique outcomes. Although it has consistently been shown that the form of FWA influences the outcomes of FWA, as indicated by the results of the present study along with previous findings (e.g. Allen et al., 2013; Haley & Miller, 2015), few studies in the current review broke flexibility down into two or more of its forms. Until there is more research investigating and comparing the forms and utilizations of FWA, outcomes associated with the various features of FWA on health behaviours and outcomes should be interpreted with caution.

In addition to differentiating between forms and utilizations of FWA, additional research exploring the differential outcomes of FWA based on occupational characteristics and the individuals within those occupations is needed. The present review highlights the lack of existing research that focuses on particular occupations or industries when assessing how FWA relate to health outcomes, with the majority of studies analysing a variety of occupations within the same sample. Occupational characteristics likely have an impact on the outcomes of FWA and determine which FWA are most appropriate to employ. Until there are more primary studies investigating the effects of FWA on individuals across different occupations, the unique impact of FWA on specific types of occupations and industries will remain unclear.

Conclusion

The present meta-analytic review explored the relationships between FWA and physical health, absenteeism, somatic symptoms, and physical activity. The present findings indicate that FWA has a positive influence on workers' physical health, as there were small, yet significant, relationships between FWA policies and better physical health, reduced absenteeism, and fewer somatic symptoms. These findings have significant implications for the world of work as the global transition to FWA use and availability continues to accelerate and evolve following the COVID-19 outbreak. No support was provided for the relationship between FWA and physical activity; however, due to the scarcity of

research investigating this relationship, definitive results should be suspended until additional primary studies are conducted examining this relationship. In addition to determining the need for more thorough research on the relationships between FWA and health-related behaviours and outcomes, this study synthesises inconsistencies throughout the literature and provides support for the implementation of FWA policies as a tool for promoting and sustaining worker health. The present insights into several health-related outcomes of FWA suggest that FWA policies can have a positive impact on worker health and should continue to be implemented, researched, and supported in order to maximise the individual and organisational benefits of this ever-expanding approach to work.

Note

1. Meta-analytic analyses were also conducted using the second, third, and fourth time points for studies that had data for more than one time point. The significance (or insignificance) of the results did not change for any of the outcomes of interest.

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No potential conflict of interest was reported by the author(s).

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Appendices

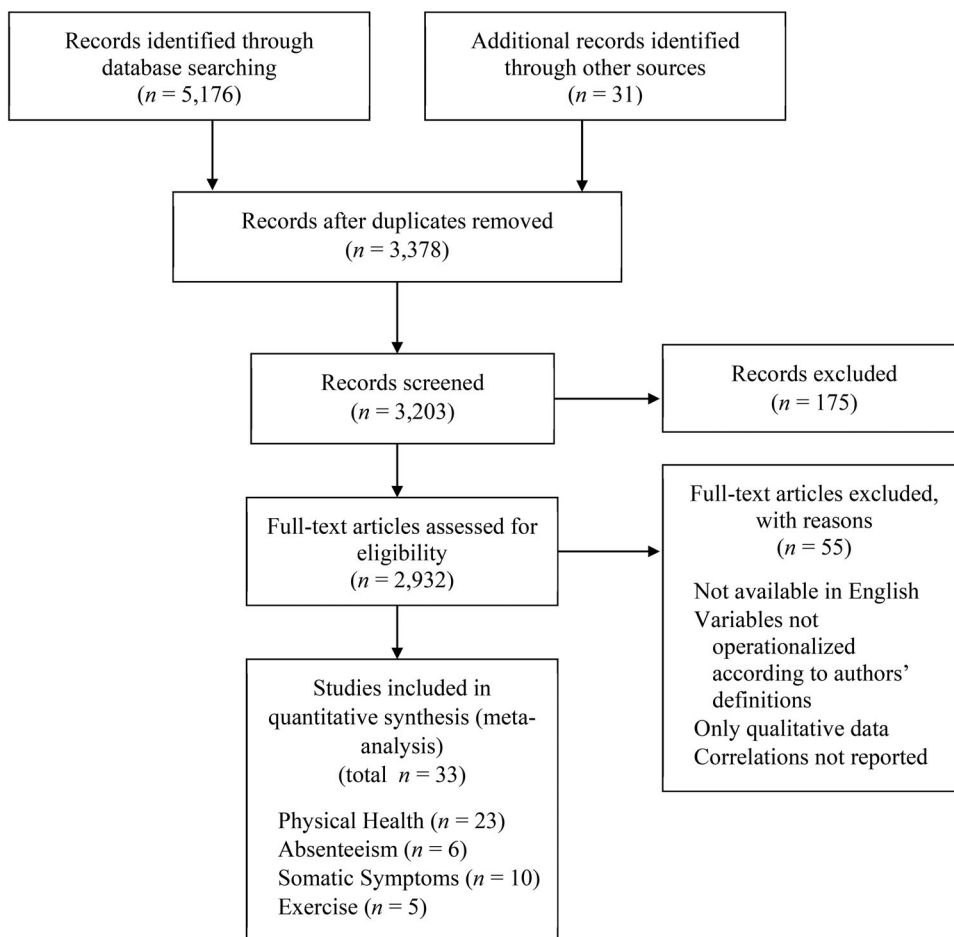


Figure A1. Flowchart of the study identification, inclusion, and exclusion process.

Table A1. Study Characteristics Examining the Flexibility – Health Relationship.

Study	Sample Description	Job Types	Country	Sample Size	r_{xy}	Measure (IV)	α (IV)	Measure (DV)	α (DV)
Beutell and Schneer (2014)	2008 National Study of the Changing Workforce (<i>Hispanics only</i>)	Variety	US	2988	.14	–	–	–	–
Carlson et al. (2011)	Full-time working mothers in Forsyth County, North Carolina	Variety	US	179	.27	Elovainio et al. (2005)	.80	Ware, Kosinski, and Keller (1996)	.80
Cotti et al. (2014)	2008 National Study of the Changing Workforce	Various	US	1632	.10	–	–	–	–
De Boer et al. (2002)	Male security guards from a single district of Belgium	Security guards	Belgium	514	.16	Van Veldhoven and Meijman (1994)	.72	Dirken (1976)	.87
Deery et al. (2017)	Police emergency call center operators	Emergency call center operators	England	236	.29	Ad hoc	.90	Cyphert (1990)	.80
Erden Bayazit and Bayazit (2019)	White-collar managers/professionals	Variety	Turkey	227	.09	–	–	Ad hoc	.82
Faurote (2015)	Employed women	Variety	US	302	.11	Elovainio et al. (2005)	.86	Ware, Kosinski, and Keller (1996)	.70
Goguen (2017)	Archival data set from Mturk	Variety	US	470	.08	Allen (2002)	.90	–	–
Haley and Miller (2015)	2008 National Study of the Changing Workforce (<i>work 20+ hours per week and are not self-employed</i>)	Variety	US	1678	.16	–	–	–	–
Halpern (2005)	1997 National Study of the Changing Workforce	Variety	US	1955	.08	–	–	–	–
Jang (2009)	2002 National Study of the Changing Workforce	Variety	US	980	.08	–	–	–	–
Jones et al. (2008)	Nationally representative sample of workers in Singapore	Variety	Singapore	1601	.03	Ad hoc	.91	–	–
Martens, Nijhuis, Van Boxtel, & Knottnerus (1999)	General practitioners with unique schedules	General practitioners	Belgium	116	.12	–	–	Dirken (1976)	.87
McGonagle, Fisher, Barnes-Farrell, & Grosch (2015)	Employees from six medium-sized manufacturing companies	Manufacturing	US	649	.17	–	–	–	–
McNamara et al. (2013)	2007–2008 Age & Generations Study (Sloan Center on Aging & Work)	Variety	US	1838	.12	–	–	–	–
Moen et al. (2013b)	White-collar employees at the headquarters of a large retail firm	Variety	US	550	.16	Thomas and Ganster (1995)	.78	–	–

(Continued)

Table A1. Continued.

Study	Sample Description	Job Types	Country	Sample Size	r_{xy}	Measure (IV)	α (IV)	Measure (DV)	α (DV)
Okulicz-Kozaryn and Golden (2018)	1998, 2002, 2006, 2010, and 2014 General Social Survey	Variety	US	1806	.18	–	–	–	–
Pagnan et al. (2017)	2008 National Study of the Changing Workforce (<i>work 30+ hours per week and live with 1+ children under 18</i>)	Variety	Netherlands	811	.14	–	–	–	–
Rudolph and Baltes (2017)	2007–2008 Sloan Center on Aging and Work's Age and Generations Study	Variety	US	806	.15	Pitt-Catsoupes & Smyer (2013)	.82	Turner-Bowker et al. (2003)	.85
Shinn et al. (1989)	Full time employees with at least one child	Variety	US	644	.08	–	–	National Center for Health Statistics (1982)	.61
Treiber and Davis (2012)	2002 General Social Survey	Variety	US	1602	.13	–	–	Ad hoc	.63
Wilson et al. (2004)	Employees from one retail organization	Retail	US	1130	.08	Bohen and Viveros-Long (1981)	.87	–	–
Zheng, Molineux, Mirshekary, and Scarparo (2015)	2007 General Social Survey	Variety	Australia	700	.08	–	–	–	–

Notes: r_{xy} : relationship between flexibility and health. $\alpha(IV)$: reliability estimate for the measure of flexibility. $\alpha(DV)$: reliability estimate for the measure of health.
 - represents single-item measures of constructs for which reliability estimates cannot be calculated.

Table A2. Study Characteristics Examining the Flexibility – Exercise Relationship.

Study	Sample Description	Job Types	Country	Sample Size	r_{xy}	Measure (IV)	α (IV)	Measure (DV)	α (DV)
Faurote (2015)	Employed Women	Variety	US	302	-.03	Elovainio et al. (2005)	.86	CDC Behavior Risk Factor Surveillance Survey (2009)	–
Goguen (2017)	Archival data set from Mturk	Variety	US	470	.09	Allen (2001)	.90	–	–
Pagan, Seidel, and Wadsworth (2017)	2008 National Study of the Changing Workforce	Variety	US	811	.03	–	–	–	–
Pedersen (2014)	Parents with preschool-age children	Variety	US	144	.28	Western Regional Project W-167 (2002)	.86	–	–
Peters, Houkes, de Rijk, Bohle, Engels, and Nijhuis (2016)	Nurses	Nursing	Netherlands	247	-.01	Peters et al. (2016)	.61	Pronk (2012)	–

Notes: r_{xy} : relationship between flexibility and exercise. $\alpha(IV)$: reliability estimate for the measure of flexibility. $\alpha(DV)$: reliability estimate for the measure of exercise. – represents single-item measures of constructs for which reliability estimates cannot be calculated.

Table A3. Study Characteristics Examining the Flexibility – Absenteeism Relationship.

Study	Sample Description	Job Types	Country	Sample Size	r_{xy}	Measure (IV)	α (IV)	Measure (DV)	α (DV)
Anderson et al. (2002)	1997 National Study of the Changing Workforce	Variety	US	2248	.01	Ad hoc	.81	Ad hoc	.81
Deery, Walsh, Zatzick, and Hayes (2017)	Police Emergency Call Center	Police Emergency Call Center Operators	England	236	-.12	Ad hoc	.90	–	–
Elovainio et al. (2005)	Finnish 10-town Study	Government Employees	Finland	31400	-.08	Ala-Mursula et al. (2002)	.82	–	–
McGonagle, Fisher, Barnes-Farrell, and Grosch (2015)	Six Manufacturing Organizations	Manufacturing	US	649	-.05	–	–	–	–
Thomas and Ganster (1995)	Healthcare Facilities in Nebraska	Healthcare Professionals	US	398	.05	Ad hoc	–	–	–
Wilson et al. (2004)	White-collar Employees in the Corporate Headquarters of a retail firm.	Variety	US	1027	-.12	Bohen and Viveros-Long (1981)	.87	–	–

Notes: r_{xy} : relationship between flexibility and exercise. $\alpha(IV)$: reliability estimate for the measure of flexibility. $\alpha(DV)$: reliability estimate for the measure of exercise; – represents single-item measures of constructs for which reliability estimates cannot be calculated.

Table A4. Study Characteristics Examining the Flexibility – Somatic Symptoms Relationship.

Study	Sample Description	Job Types	Country	Sample Size	r_{xy}	Measure (IV)	α (IV)	Measure (DV)	α (DV)
Albrecht et al. (2020)	Swedish Longitudinal Occupational Survey of Health (SLOSH)	Variety	Sweden	19360	−.12	Elovainio et al. (2005)	.93	Ad hoc	–
De Boer et al. (2002)	Male security guards from a single district of Belgium	Security guards	Belgium	514	−.02	Van Veldhoven & Meijman (1994)	.72	–	–
Kinman and Jones (2008)	Academic/Academic-Related Staff at Higher Education Institutions	Academics/Academic-related Staff	UK	844	−.19	Ad hoc	.87	Spector & Jex (1998)	–
Moen et al. (2013b)	White-collar employees at the headquarters of a large retail firm	Variety	US	550	−.17	Thomas and Ganster (1995)	.78	–	–
Tanskanen (2020)	Finnish Quality-of-WorkLife Surveys (FWLS)	Variety	Finland	11165	−.07	Ad hoc	.72	–	–
Thomas and Ganster (1995)	Healthcare Facilities in Nebraska	Healthcare Professionals	US	398	−.16	Ad hoc	.75	Ad hoc	.88
Treiber and Davis (2012)	2002 General Social Survey	Variety	US	1602	−.08	–	–	–	–
Tucker and Rutherford (2005)	Members of a Trade Union Representing Train Operators	Train Operators	UK	372	−.26	Ad hoc	.86	Barton et al. (1995)	.83
Vahle-Hinz et al. (2013)	Public Agencies	On-call Workers at Publicity Agencies	Germany	478	.02	Lewchuck et al. (2005)	.66	Mohr and Müller (2005)	.91
Wilson et al. (2004)	White-collar Employees in the Corporate Headquarters of a retail firm.	Variety	US	1027	−.16	Bohen and Viveros-Long (1981)	.87	Ad hoc	.89

Notes: r_{xy} : relationship between flexibility and exercise. $\alpha(IV)$: reliability estimate for the measure of flexibility. $\alpha(DV)$: reliability estimate for the measure of exercise.; – represents single-item measures of constructs for which reliability estimates cannot be calculated.