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Using nudges to promote physical activity and to reduce sedentary behaviour in the workplace: a scoping review protocol

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ABSTRACT

Introduction Physical inactivity and sedentary behaviour are associated with numerous health problems and increasing risks of premature morbidity and mortality. Workplace health promotion with a focus on increasing physical activity (PA) and reducing sedentary behaviour is of growing interest. The concept of choice architecture with the use of nudges is a promising approach to influence decision making regarding health behaviours. It can help to understand why people often fail to act in their best interest, to follow well-informed preferences or to achieve their set goals. Nudges, the way the choice is presented, can help to overcome these challenges by using the same habits, biases or boundaries to alter our decision-making in favour of the more preferred behaviour. Aims of the scoping review will be to analyse (a) to what extent the concept of choice architecture is used in workplace health promotion to promote PA and/or to reduce sedentary behaviour and (b) which instruments (nudges) are used to archive that.

Methods and analyses Medline, PsychInfo, Web of Science and CINHAL will be searched from 2009 until June 2020. Applying a two-level screening process, title and abstracts will be screened according to a set of predetermined inclusion and exclusion criteria. Included articles will be screened a second time to determine the extent to which choice architecture has been used. Analyses for publication year, location, setting and target group will be provided. Interventions will be analysed presenting the instruments used, number of studies per instrument, combinations of instruments and alteration of the environment. Outcome measures and results will be reported as they occur.

Ethics and dissemination Due to the nature of the scoping review, ethical concerns are minimal. No patient data will be included. Results are published in peer-review journals.

Strengths and limitations of this study

- Following methodology of the Joanna Briggs Institute for scoping review and reporting in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow chart.
- Screening done by two researchers independently.
- Interventions that do not state that they use choice architecture as theoretical approach are not included.
- Embase is not included because of limited access.

BACKGROUND

One in four adults has an insufficient level of physical activity (PA).[1 2] Physical inactivity and prolonged sedentary behaviour (SB) are associated with numerous health problems and increased risk of premature morbidity, disability and mortality.[1 3 4] Extensive evidence has been summarised on the benefits of routine PA for individual health status, with protective effects in various chronic diseases (eg, cardiovascular disease, stroke, hypertension, colon and breast cancer, type 2 diabetes). Even small changes in PA levels are of high relevance for risk reduction and better health.[1] The WHO emphasises the promotion of PA as a key objective of disease prevention and health promotion in the coming decade. Workplace health programmes offer many adults an opportunity to increase PA and reduce SB during the workday.[2] Active commuting to and from work, active breaks, sit-stand desks or stair use prompts offer ample opportunities to increase PA as part of daily activities and can therefore contribute to increased productivity and reduced injury.[5 6] Through the workplace, it is possible to influence health behaviour of a large population group, directly affect the physical, mental, economic and social well-being of workers and indirectly the health of their families.[5] For example, according to Eurostat, 73.1% of the population aged 20–64 are employed in the EU-27 in 2019; what makes the workplace an important setting for health promotion.[7]

Numerous reviews explore the workplace as setting for public health interventions to promote PA or reduce SB; for example, role of workplace health programmes to enhance PA to increase productivity and reduce

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absenteeism,[8–11] by targeting musculoskeletal disorders, lower back pain,[12 13] chronic diseases[14] and by or by calculating the costs saved with a healthier workforce.[6] The workplace plays a role in obesity prevention, either through weight management programmes or through multilevel interventions that combine healthy diet and PA.[15–17] Programmes exist for certain groups such as university staff,[18] nurses,[19] healthcare workers[20] or male workers.[21] Another focus is intervention design and characteristics. There are reviews analysing methods used,[22 23] theoretical approaches used to develop the intervention,[24] role of participants characteristics,[25] recruitment rates[25 26] or perspectives of the employees regarding feasibility and acceptability.[27] There is an extensive body of literature analysing the effectiveness of workplace health promotion interventions, either PA promotion or SB reduction interventions or of multilevel intervention combining nutrition, well-being and PA/SB interventions.[17 21 28–34]

Some reviews analysed intervention characteristics. Rongen *et al* analysed intervention characteristics of workplace health promotion interventions, focusing on the influence of population, study and intervention characteristics and quality on the effectiveness of the interventions. However, they do not report on the use of choice architecture as theoretical approach.[34] Jirathananuwat *et al* described and classified workplace interventions to promote PA in their systematic meta-review.[35] They identified 48 interventions, 22 interventions focus on predisposing and 17 interventions on enabling employees to have more PA. Of the 22 predisposing factors, 6 were information delivery, 5 were self-motivation and 11 were programme training. The enabling approaches were instrument resources and health service facilities. The reinforcing approaches were incentives and social support. The remaining interventions focused on the environmental development and policy regulation. However, since they specify the instruments used within the intervention, they do not indicate whether the intervention was designed according to choice architecture approaches.

Malik *et al* reviewed workplace health promotion PA interventions to explore the type of interventions used. They found three intervention types: exercise, counselling or information intervention.[36] Chu *et al* investigated different intervention strategies—such as multicomponent and environmental strategies—to reduce sitting time at the workplace.[37] With regard to an ageing workforce Poscia *et al* conducted a review on workplace health promotion programmes for older employees emphasising the need for future research on well-designed and cost-effective interventions to improve work-related outcomes.[38] However, all three reviews do not report on the use of choice architecture.

Despite all the studies and promising results, people have difficulties in changing their behaviour, even if they want to change their lifestyle, have the awareness, intention and ability to do so. Behavioural insights can help to understand why people often do not act in their best interest, follow well-informed preferences or fail to achieve their set goals. Nudges can help to overcome these challenges by using the same habits, biases or boundaries to alter human decision-making in favour of the more preferred behaviour.[39 40] While behavioural insights is an approach to alter the architecture in which choices are made, nudges can generally be seen as the way choices are presented,[41] as the deliberated 'effort to channel people into making decisions that are best for them'.[42] Following Hansen *et al* nudges can be defined as

> a function of any attempt at influencing people's judgment, choice or behaviour in a predictable way (1) that is made possible because of cognitive boundaries, biases, routines and habits in individual and social decision-making posing barriers for people to perform rationally in their own declared self-interests and which (2) works by making use of those boundaries, biases, routines, and habits as integral parts of such attempts.[43]

This approach has been used in different areas such as energy use,[44 45] finance,[46 47] food choice,[48–54] consumer[55 56] or environmental protection.[57 58] In the field of PA/SB, Nocon *et al* analysed the role of point of choice prompts to increase PA.[59] Landais analysed studies on microenvironmental choice architecture interventions that promoted PA or discouraged SB in adults.[60] Eighty-six studies targeted PA, predominantly stair use, whereas two studies targeted SB and one study targeted both behaviours. The intervention techniques identified were prompting (n=53), message framing (n=24), social comparison (n=12), feedback (n=8), default change (n=1) and anchoring (n=1). Although 19 workplace-related were included in the review, no results specifically related to them were reported. Forberger *et al* analysed choice architecture interventions to promote PA within the general population[40] and Szaszi *et al* provided an overview of the areas in which choice architecture was most commonly used. The most studied area was health, with most studies aimed to change eating or drinking behaviour, followed by studies attempted to alter sustainability behaviour, consumer choice, prosocial behaviour, finance, transport and education.[61] The setting in which the studies were conducted was not analysed. At present, we are not aware of a systematic review or map that analysed interventions using choice architecture instruments to promote PA and/or to reduce of SB in the workplace.

Therefore, the paper aims to give an overview of choice architecture techniques used to increase PA and/or to reduce SB in the workplace setting to enrich research and practice on nudges as effective tools in setting-based health promotion.

This scoping review aims to:

1. Provide an overview of the application of the choice architecture approach in workplace health promotion (frequency of use).

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Table 1 List of search themes and terms used for the search strategy

Search themes		Search terms	Search type
A	Physical activity	physical activit*, standing, walk*, active, exercise, active break*, sitting break*, walking break*, active transport*, commut*, biking, cycling	Title/abstract
		exercise, sports, motor activity	MeSH term
B	Sedentary behaviour	sedentary behaviour*, sedentary behavior*, sedentary lifestyl*, sedentary, sit, sitting, seat, seated, inactive, physical inactivity	Title/abstract
		sedentary behavior	MeSH term
C	Workplace	work, organization*, organisation*, company, job site, office, worker, employee*, white-collar, workplace*, worksite*, workspace*, workstation*	Title/abstract
		workplace, work, workforce	MeSH term
D	Workplace health promotion	health promotion	Title/abstract
		health promotion, occupational health service	MeSH term

2. Inform about the intervention characteristics (target group, nudge used, length, content, organisational context).
3. Give an overview on the mode of delivery (eg, analogue, digital, face-to-face).
4. Identify outcome measures.

METHODS

The methodology for this scoping review will follow the guidelines of the Joanna Briggs Institute.[62] Although the scoping review differs from systematic reviews in that it does not focus on evidence-based synthesis, features of the systematic search process will be followed

As a scoping review, the underlying objectives are (a) to analyse the body of literature found for workplace health promotion programmes in regard to choice architecture, (b) clarify intervention characteristics and mode of delivery and (c) to identify outcome measures.[63] The literature will be analysed and gaps identified for further research.[63] The Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram, which is used for reporting in systematic reviews, will be used for a transparent report of the article flow.[64 65]

Search strategy

Search string

The research question will reflect the PICO elements. PICO is an acronym for population, intervention, comparator and outcome.

The study population covers the working population as we analyse workplace health promotion interventions related to the choice architecture literature to increase PA and to reduce SB within the working day. Studies mention the use of choice architecture techniques and nudges against other intervention techniques as a comparator. Primary outcome is increased of PA and/or reduced of SB. As the distribution of the choice architecture approach is a focus of the search, no predefined outcomes beyond effective/not effective will be used. All further outcomes mentioned will be collected and presented as an overview.

Identification of relevant keywords for the search string will be conducted by the team of authors with the help of a science librarian (table 1). Terms will be linked by using BOOLEAN logic. The search will be developed in an iterative process.[66] The search string will be pretested in the PubMed database online supplemental file 1 and refined by examining the research results. The agreed search string will be adapted to other databases according to necessary changes.

Languages

No language restrictions are applied in the search. Due to the requirements of the literature databases for the indexing of journals, English titles and abstracts are also available for journals that publish in the national language. Thus, the language restriction can be omitted. We will exclude papers that are not published in English/German during the full-text screening and mark them accordingly in order to record the number of papers to be excluded due to language reasons.

Databases

The search will be performed in the following bibliographic databases (table 2):

While the use of choice architecture approaches is not new and many studies in psychology[67] could retrospectively be categorised as using nudges according to

Table 2 Overview of bibliographic databases used

Database		Provider	Time span
1	Medline	PubMed	2009–06/2020
2	PsycInfo	Ovid	2009–06/2020
3	Science Citation Index Expanded	Web of Science	2009–06/2020
	Social Science Citation Index		2009–06/2020
	Arts and Humanities Citation Index		2009–06/2020
4	CINAHL	EBSCO	2009–06/2020

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Table 3 Predefined data extraction sheet with categories of the extracted data and corresponding characteristics

Category		Characteristics	
1	Author	All authors of the publication	
2	Year	Year of publication	
3	Publication type	Journal article, report	
4	Origin	The country in which the intervention was carried out	
5	Study design	Study design used	
6	Workplace characteristics	Workplace setting of intervention specified organisational context: (1) industry, (2) size, (3) area (urban or rural)	
7	Aim of the intervention	Aim of the intervention and targeted behaviour of the intervention (PA and/or SB with specific subdomain of activity behaviour, for example, standing, walking, stair use, active breaks, active transport)	
8	Intervention	Short description of the intervention: (1) content, (2) length (follow-up period)	
9	Target group specifications	Details reported about the target group such as: (1) age, (2) gender, (3) organisational level (eg, manager, subordinates, apprentices, trainees, other staff), (4) occupation type (eg, white-collar or blue-collar worker), (4) excluded persons (eg, disabled persons)	
10	Implementation management	Responsibility for implementation (if specified): (1) decision maker, (2) executer of intervention (internal, eg, HR Management or external, eg, contractor, research team), (3) others involved	
11	Mode of delivery	Specified mode for intervention delivery: (1) analogue/conventional (eg, paper-pencil, poster), (2) digital (eg, apps, portals, wearable, email), (3) face-to-face (eg, meetings, through coach)	
12	Choice architecture elements used	Following the MINDSPACE approach[70]	
		Messenger	We are heavily influenced by who communicates information
		Incentives	Our responses to incentives are shaped by predictable mental shortcuts such as strongly avoiding losses
		Norms	We are strongly influenced by what others do
		Default	We 'go with the flow' of preset options
		Salience	Our attention is drawn to what is novel and seems relevant to us
		Priming	Our acts are often influenced by sub-conscious cues
		Affect	Our emotional associations can powerfully shape our actions
		Commitments	We seek to be consistent with our public promises, and reciprocate acts
		Ego	We act in ways that make us feel better about ourselves
13	Choice architecture elements with special focus on microenvironment	Typology of intervention in accordance with TIPPME[71]: (1) placement: Availability, position, (2) properties: Functionality, presentation, size, information Any information on active design guidelines used	
14	Typology of used instruments with special focus on technique use	Any instrument mentioned	
15	Outcome measures	Outcome variable(s) reported: PA-related and SB-related (eg, expenditure, step count, time spent sitting or standing) measurement instrument used: subjective and/or objective (eg, self-report, diary, wearable)	
16	Intervention results	Study results	

PA, physical activity; SB, sedentary behaviour; TIPPME, typology of intervention in proximal physical microenvironments.

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Thaler and Sunstein,[68] the conscious application of its underlying processes and knowledge on behavioural change and decision making gained new interest in research after 2009 following the publication of their ground-breaking book.[68] Therefore, the starting point for the search will be in 2009. In addition, the reference lists of included articles will be screened for additional articles.

Study inclusion criteria and screening procedure

Inclusion and exclusion criteria

Articles will be eligible for inclusion if they (a) cover interventions in the workplace, (b) aim at increasing PA or reducing SB, (c) that are designed by using choice architecture and (d) and name the theoretical approach accordingly. Our aim is to determine the frequency of use. Therefore, no indirect classification is used. The explicit naming of the choice architecture approach is necessary to be eligible. (e) All study designs are applicable. While the search and the title/abstract screening will be done without language restrictions, during the full-text screening articles will be excluded not written in English/German. In this way the proportion of literature in other languages can be determined. Further, interventions aimed at non-communicable diseases, weight management, obesity, pain reduction or other disorders will be excluded.

Screening strategy

The screening process will be managed with the help of the reference management software EndNote and the online software Covidence. The first step will be to remove all duplicates in EndNote, first within each database and then across databases. A second de-duplication will be performed in Covidence. After all duplicates have been removed, Covidence will be used for the screening. The screening process will follow predefined inclusion and exclusion criteria and will be a two-step procedure.

To answer the scoping review question about the frequency of use, all titles and abstracts will be screened to determine, if the intervention is conducted in the workplace and aims at increasing PA and/or reducing SB. During the full-text screening, the methodological approach will be assessed to determine whether a choice architecture approach is used. Only papers stating that they used choice architecture will be included. The entire screening process is carried out by two independent reviewers.[69] Any disagreements will be resolved either by consensus or by discussion with a third reviewer. If no decision can be reached, studies will be discussed with an expert not involved in the screening process.

If there are doubts about eligibility, studies will be included in the next step. If, after the screening process, the eligibility of the studies remains unclear, further information will be obtained, also by contacting the study authors.[69]

Data extraction and coding strategy

A number of relevant classification systems have evolved in the last years. For this study, the MINDSPACE framework[70] and TIPPME as the 'typology of intervention in proximal physical microenvironments' (eg, staircase)[71] will be used. A combination of both classification systems will be used because while MINDSPACE can be seen as a list of instruments that can be used to alter behaviour, TIPPME focuses on the microenvironment. MINDSPACE is the acronym for messenger, incentives, norms, defaults, salience, priming, affect, commitments, and ego. That are nine of the most robust (non-coercive) influences on behaviour and can be used as checklist when making policy.[70]

Information will be organised by predefined extraction categories with corresponding characteristics in an extraction sheet. The extraction sheet will be pretested on three randomly chosen studies and adapted in an iterative process beforehand. The predefined data extraction sheet is presented in table 3. If information is not reported 'n/a' will be stated. Data extraction will be done by one reviewer. A second reviewer will analyse 10% of the records for quality reasons.

Research synthesis

Only studies with full data extraction—hence those using behavioural interventions—will be specified in the results section. Research synthesis will be based on the items from the extraction sheet following a narrative synthesis which gives an overview of the proportion of interventions that use a choice architecture approach. Analyses for publication year, location, setting and target group (included and excluded persons) will be provided. In this process, intervention instruments will be analysed related to choice architecture concept, number of studies per instrument used and combinations of instruments. Furthermore, a special focus will be given to alterations in a specific environment and the use of digital approaches. Outcome measures (variables and instruments) and results will be reported as they occur. Additionally, tables will be used to present the results of the literature analysis.

ETHICS AND DISSEMINATION

Due to the nature of the scoping review, ethical concerns are minimal. No patient data will be included. The scoping review will collect, synthesise and present previously collected and published data. If ethical concerns arise, the respective data will be excluded. Findings will be published in a pertinent journal article and the authors will disseminate the results within their research network through stakeholders and presentations.

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