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I do as I am: understanding and leveraging identity to promote smoking cessation and physical activity

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Chapter 2

Mapping the evidence on identity processes and identity-related interventions in the smoking and physical activity domains: A scoping review protocol

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ABSTRACT

Introduction: Smoking and insufficient physical activity (PA), independently but especially in conjunction, often lead to disease and (premature) death. For this reason, there is need for effective smoking cessation and PA-increasing interventions. Identity-related interventions – which aim to influence how people view themselves – offer promising prospects, but an overview of the existing evidence is needed first. This is the protocol for a scoping review aiming to aggregate the evidence on identity processes and identity-related interventions in the smoking and PA domains.

Methods: The scoping review will be guided by an adaption by Levac et al of the 2005 Arksey and O'Malley methodological framework, the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analysis: Extension for Scoping Review (PRISMA-ScR) and the 2017 Joanna Briggs Institute guidelines. It will include scientific publications discussing identity (processes) and/or identity-related interventions in the context of smoking (cessation) and/or physical (in)activity, in individuals aged 12 and over. A systematic search will be carried out in multiple databases (e.g., PubMed, Web of Science). Records will be independently screened against pre-piloted in-/exclusion criteria by two reviewers, using the ASReview machine learning artificial intelligence, and Rayyan QCRI, a screening assistant. A pre-piloted charting table will be used to extract data from included full-text articles. Findings will be reported according to the PRISMA-ScR guidelines, and include study quality assessment.

Ethics and Dissemination: Ethical approval is not required for scoping reviews. Findings will be presented at scientific conferences and published in an open-access peer-reviewed journal.

Registration: This protocol was pre-registered on the Open Science Framework (https://osf.io/hkd9c).

INTRODUCTION

Smoking and insufficient physical activity (PA), individually but especially in conjunction, are key preventable factors of disease (e.g., cardiovascular diseases and cancer) [1–3], and (premature) death [4,5]. It is unlikely that new risk factors will be identified which have a similar or larger impact on health [6], especially when co-occurring [7–9]. Despite this, worldwide, one fifth of the population still smokes regularly [4] and one third to half fails to engage in regular physical activity (PA) [10]. The most effective actions to reduce health risks are to quit smoking and increase levels of PA [3,11,12]. While over the past decennia, an impressive number of smoking cessation and/or PA-enhancement interventions have been developed and tested, reviews show that they typically only have small to medium (short-term) effects [13,14]. With only mildly successful interventions but impactful health risks, there is need for new and effective strategies to achieve successful smoking cessation and increased PA.

Identity theories and identity-related interventions (i.e., which aim to influence how people view themselves) offer promising prospects in facilitating smoking cessation and increased PA. Identity typically starts forming around the age of 12 and continues to form throughout adolescence until adulthood [15]. According to identity theories, people prefer to act in line with their self-identity – the way one sees and perceives oneself – [16–21] and/or group identity – perceptions of the self derived from being part of groups or social categories – [17,22]. Identity theories consider identity an important motivator of (health) behaviour, including smoking, a health compromising behaviour, and PA, a health promoting behaviour. They also posit that behaviour change is unlikely unless the new (smoking/PA) behaviour matches the person's self and/or group identity.

Empirical studies in the context of smoking and PA illustrate the importance of identity-behaviour congruence. For example, it has consistently been found that, in order to (intend to) quit smoking successfully, smokers need to see themselves more as quitters or non-smokers and less as smokers [23–33]. Seeing oneself as (physically) active may also facilitate smoking cessation, because holding such a health-promoting identity may feel incompatible with engaging in health-compromising behaviour such as smoking [34]. By the same token, (greater) exercise intention and enactment has been shown to be facilitated by holding PA-related identities, e.g., 'exerciser' [35,36], 'weightlifter'[37], 'runner' [34] or 'participant in sports' [38]. However, despite clear indications that identity plays an important motivational role for both a health compromising (smoking) and health promoting behaviour (PA), existing evidence is somewhat scattered across the scientific literature. This makes it difficult to fully comprehend the role of identity processes in smoking (cessation) and physical (in)activity. Evidence for identity processes in the PA domain has been previously aggregated in two systematic reviews including meta-analyses [39,40], while

in the smoking domain, a meta-analysis [41], meta-synthesis [19] and meta-ethnography [42] have addressed identity. However, these articles are either outdated [19], review only qualitative data [40], look only at young adults or youth [39,40], or study multiple addictive substances altogether [41]. In addition, none focus on smoking as well as inactivity simultaneously, while as mentioned earlier, the combination of both lifestyle behaviours increases the incidence of health risks. Moreover, it is unclear what (type of) identity-related interventions are being employed and why, and whether they are effective in stimulating identity change and behaviour change. Without a thorough understanding of the role of identity in (changing) smoking and PA behaviours, it will likely remain difficult to develop effective identity-related interventions targeting both health behaviours. This may also be why, to date, only two identity-related intervention [34,43], which targets both health behaviours in conjunction, has been reported on in the scientific literature. In a nutshell, the research field is in need of a comprehensive overview encapsulating the role of identity in the contexts of smoking (cessation) and (insufficient) PA to guide the development of identity-based interventions targeting both health risk factors at once. The review to which this protocol belongs aims to provide such an overview.

Personal characteristics have been found to be associated with differences in smoking and PA, and identities. For example, smoking and insufficient PA have been found to be especially prevalent and co-occurring among socio-economically disadvantaged individuals [8,44–48], men [8] and those with lower levels of health literacy [46]. Also, PA [49] and the likelihood of quitting smoking [50] tend to decline with age. Furthermore, findings show that individuals who started smoking young – around the age of 14-16 [51,52], who are more nicotine dependent [32,51,53,54] and who are heavy smokers (i.e., who smoke 10+ cigarettes per day) [55] are less likely to quit smoking. With regard to personal characteristics and smoking- and PA-related identities, empirical studies have found that individuals with lower socioeconomic position (SEP) [29], individuals who are more nicotine dependent [31,53] and older individuals [32] generally identify more with smoking than with quitting.

In sum, smoking and PA-identities and behaviours have been found to vary based on demographic characteristics. Plausibly, this makes personal characteristics highly relevant to consider in a review aiming to synthesize the role of identity in smoking (cessation) and physical (in)activity. Additionally, investigating variations in the role of identity on the two health behaviours depending on personal characteristics will prove useful in developing identity-related interventions for specific target groups. This scoping review will therefore take into consideration demographic characteristics (i.e., SEP, health literacy, age, sex), smoking-specific characteristics (i.e., age at onset smoking, heaviness of smoking) and PA-specific characteristics (i.e., levels of physical (in)activity) when mapping the available evidence.

In short, the current article describes the protocol for a scoping review aiming to map the available scientific evidence regarding identity processes and identity-related interventions and possible personal characteristics in the contexts of smoking and PA. A scoping review was chosen over other types of syntheses because it allows to uncover and analyse (different types of) evidence about the topic and to inform areas for practice and future research [56,57]. Findings are expected to aid the development of future identity-related interventions aiming to facilitate smoking cessation and increased PA. One such intervention is *Perfect Fit* (see Funding Statement), a virtual coaching intervention being developed by the authors of this review as part of a large Dutch consortium, which will employ identity-related interventions to motivate people to quit smoking and increase their PA levels.

Next to being the first to provide a comprehensive overview of the evidence on the role of identity, in the domains of smoking and PA, and to directly inform the development of interventions such as *Perfect Fit,* this scoping review will also be innovative methodologically. It will be the first in the field to make use of Active Learning for Systematic Reviews (ASReview), a machine learning technology to select relevant literature (see Stage 3 of Methods and Analysis).

METHODS AND ANALYSIS

We conducted Preliminary searches of the Open Science Framework (OSF), Cochrane Database of Systematic Reviews, Joanna Briggs Institute (JBI) Evidence Synthesis and PROSPERO in December 2020 – at the conception of the study, in February 2021 – before pre-registering the protocol on OSF, and, as additional verification, in September 2021, after finalizing the protocol manuscript. No current or underway systematic reviews or scoping reviews on the topic were identified.

The present scoping review protocol follows the adapted methodological framework for scoping reviews of Levac et al. [58], originally developed by Arksey & O'Malley [59]. This protocol as well as the final scoping review also conform to the guidelines published by the JBI [60] and the recent PRISMA extension for scoping reviews (PRISMA-ScR) guidelines [61]. These guidelines were developed as a result of increasing popularity of scoping reviews and as a means to improving their quality.

Stage 1: Identifying the research questions

Guided by the PRISMA-ScR Population, Concept, Context (PCC) principles, the research team agreed on articulating the following research questions:

RQ1 – what is known about identity (processes) in adolescents and adults, in the contexts of smoking and PA, taking into consideration certain demographic characteristics (i.e., SEP, health literacy, age), smoking-specific characteristics (i.e., age at onset smoking, heaviness of smoking, number of smoking years) and PA-specific characteristics (i.e., levels of physical (in)activity)?

RQ2 – What identity-related interventions are being used to influence smoking and PA in adolescents and adults, taking into consideration possible differences in implementation based on demographic characteristics (i.e., SEP, health literacy, age), smoking-specific characteristics (i.e., age at onset smoking, heaviness of smoking, number of smoking years) and PA-specific characteristics (i.e., levels of physical (in)activity)?

Stage 2: Identifying relevant studies, eligibility criteria, information sources, and search

Inclusion of literature will happen according to the PCC eligibility criteria mentioned hereafter. Chosen criteria for the review are presented here in reverse order, i.e., CCP, for readability purposes. In terms of context, we will include published, peer-reviewed scientific research papers and conference abstracts, written in English, Dutch or French. When it comes to concept criteria, we will include literature which describes identity processes relating to smoking (cessation) and physical (in)activity (RQ1) and/or describes identity-related interventions implemented in the context of smoking (cessation) and physical (in)activity (RQ2). Preferably, the literature also considers demographic characteristics (age, SEP, health literacy), smoking-related characteristics (heaviness of smoking, age at smoking onset) and PA-related characteristics (levels of physical (in)activity), although not considering these factors will not automatically lead to exclusion. With regard to population criteria, literature will be included when it studies individuals aged 12+ (on average), who smoke or have smoked tobacco (any type) or electronic cigarettes, and/or do or have engage(d) in less than their age-specific recommended levels of PA [48]. In line with the explorative nature of a scoping review, no restrictions are formulated in terms of study design or publication year. Literature will be excluded when written in another language than English, Dutch or French, and/or smoking (cessation) or physical (in)activity and related interventions are discussed without relation to identity, and/or the target population is limited to individuals younger than 12 years old (on average).

In line with JBI guidelines (Aromataris & Munn, 2020), a three-step search strategy will be designed and utilized with the assistance of an academic librarian from the Leiden University Medical Centre. Step one will consist of an initial limited search of PubMed, PsycINFO and Web of Science, using pre-defined keywords extracted from a dozen known key articles, to identify additional relevant keywords and index terms. Step two will include a second search across all relevant databases, i.e., PubMed, PsycINFO, Embase, Emcare,

Web of Science Core Collection, Wiley Cochrane Library, Psychology, Behavioural Sciences Collection and Academic Search Premier, OpenGrey.eu and British Library EthOS, using all identified keywords and index terms. In step three, the reference list of the key articles will be hand-searched for additional sources (i.e., backward reference searching, see Wohlin [62]) and missing search/index terms. A new search will be carried out using updated search and index terms and adapted to all databases (see Supplementary materials 1 for the final search string used for PubMed, which yielded the most records. Search strings for other databases are available upon request). Once full-text screening is completed, backward reference searching of included articles [62] will be used to identify new and/or missing records. Additionally, once data charting is complete, and before finalizing the synthesis, a new search using the search strategy established in step two will be carried out to identify relevant newly published records.

Stage 3: Screening and selecting studies

Following the search, and after removal of duplicates, titles and abstracts of identified records will be collated and uploaded into 1) Active Learning for Systematic Reviews (ASReview), a free and open-access machine learning technology [63], and 2) Rayyan QCRI, a free title and abstract screening assistant [64]. Following a pilot test of the screening manual, titles and abstracts will be independently assessed against eligibility criteria by two reviewers. One experienced reviewer (MV) will screen titles and abstracts using ASReview. A second reviewer (KP) will screen a random portion of titles and abstracts using Rayyan QCRI.

ASReview was chosen as primary screening tool for several reasons, the first being time-efficiency. A recent study by Ferdinands et al. [65] evaluated the technology using six systematic review datasets from different research fields, and showed that only 8.3% to 36.1% of titles and abstracts needed screening to identify the relevant ones. With each in-/exclusion decision, the ASReview algorithm learns what the reviewer finds relevant, and it subsequently sorts and presents the most relevant records first [63]. As a result, considerably fewer screening hours are needed to arrive at the final selection. A second reason for choosing ASReview is its 'human-in-the-loop' machine learning technique [66]. Through this technique, the reviewer maintains control over the entire screening process by having the final say in the relevance of every record. The reviewer is not dependent on a technology to include the relevant citations, but is aided by it. Finally, ASReview was chosen because it presents only titles and abstracts, and no authors or journal names. This allows the reviewer to judge each citation for its content rather than irrelevant metadata, and thereby removes a potential layer of "authority bias" in the choice of relevance [66]. Despite substantial advantages, ASReview remains a new, undertested technology. This is why, to mitigate possible early technological kinks, we decided to have the second reviewer (KP) manually perform the double screening of titles and abstracts in Rayyan QCRI, a widely

used and appreciated title and abstract screening assistant [64]. Rayyan QCRI facilitates the screening process by highlighting pre-defined keywords in the title and abstract, and makes easy to assign and track reasons for in-/exclusion. Additionally, Rayyan QCRI permits to screen from anywhere thanks to its offline functionality, and allows reviewers to collaborate on a project while being blind to others' screening decisions [64,67].

Regardless of the software used, screened titles and abstracts will be marked "included (for full-text screening)" or "excluded" based on assessment against the eligibility criteria. Screening in ASReview will stop after 150 consecutive records marked "excluded". ASReview software developers advise to stop after 100-120 consecutive irrelevant records [65]. However, with very little prior research to guide screen-stop decision in scoping reviews [68,69], and none using ASReview, we choose to apply a more conservative heuristic of 150 consecutive irrelevant records.

As mentioned, the second reviewer (KP) will additionally randomly double screen a small portion of the total number of records using Rayyan QCRI. The review team agreed upon a double screening amount of 10% of retrieved records. This amount was chosen because screening more would undermine the purpose, time-saving benefits and intelligence of ASReview, as also confirmed by its developers when consulted on the matter[65]. Additionally, the review team expects the search string to yield a substantial amount of records. Therefore, after double screening 10%, we expect the second reviewer (KP), to have a sufficient feel of the literature to help validate the screening decisions made in ASReview by the first reviewer (MV).

After double screening is complete, a Cohen's κ interrater agreement rate (IRA) [70] will be calculated for the titles and abstracts screened by both reviewers. If IRA reaches at least 80% – level from which IRA is considered strong [71] – double screening will stop. In case IRA is below 80%, a new random 10% of titles and abstracts will be double screened, and so on until 80% IRA is reached or all records have been double screened.

Full texts of articles included based on title and abstract screening will be managed in Microsoft Excel, and marked "included" or "excluded" based on assessment against eligibility criteria. Reason(s) for exclusion will be recorded and reported in the inclusion flowchart of the scoping review. Where a full-text is unavailable, but the article is assessed as relevant in the title and abstract screening, the authors of the paper will be contacted to request a copy of the manuscript. In case key unpublished or missing data remains unobtainable after contact with the authors, or in case the record proves irrelevant to the research after all, the record will be excluded. Full-text screening decisions will be thoroughly documented and reported in the final scoping review. A complete overview of screening decisions will be available upon request.

In accordance with PRISMA-ScR [61], a flow diagram of the search and the study inclusion process will be presented in the final scoping review. Disagreement about screening decisions will be resolved through discussion among the two reviewers, and if necessary co-authors, until consensus is reached.

Stage 4: Data charting process and data items

Data will be charted from eligible full-texts by two independent reviewers (KP and MV) using a data charting tool developed by the entire review team. The data charted will include information about the source (e.g., author, year of publication, country of origin) of the record, its methodology, its aims, and findings relevant to the review questions (main outcomes). Where available, information about demographic, smoking-specific characteristics and PA-specific characteristics will also be charted. Where required, authors of papers will be contacted to request missing or additional data. A draft charting table will be pilot tested on usability prior to starting full-text screening, and updated as necessary. As recommended by Levac et al. [58] in their methodological advice for scoping reviews, the charting table will be a living document, modified and revised as necessary during the process of charting data from each included evidence source. Modifications will be summarized in the scoping review.

In-depth assessment of how research pertaining to our review questions is conducted is, as of yet, lacking. However, such assessment could help synthesize and make sense of the findings in the final scoping review. Consequently, and although not a requirement in scoping reviews [61], we aim to critically appraise the quality of each included evidence source, using the JBI Critical Appraisal Tools [72]. These tools allow to assess the quality of numerous types of evidence sources, from randomized controlled trials to qualitative studies. Two reviewers (KP and MV) will independently assess the quality of each included full-text record, using the tool appropriate to the study design. Disagreement will be resolved through discussion among assessors, and if necessary co-authors, until consensus is reached.

Stage 5: Collating, summarizing and reporting the results

Results will be summarized into a narrative descriptive synthesis, and may include visual overviews (e.g., graph, diagram or table) of the findings (conform the PRISMA-ScR guidelines [61]). Depending on the available data, results will be presented, following the PCC principles, that is per health behaviour (smoking, PA), separately for adolescents and adults, and per moderator (heaviness of smoking, SES, health literacy, sex, age at smoking onset and physical (in)activity levels).

Stage 6: Consultation

Consistent with Arksey and O'Malley's framework [59], we will convene a team of stakeholders to assess the validity of the findings. Stakeholders will consist of clinicians and

coaches who counsel individuals with regard to their smoking (cessation) and physical (in) activity, experts in identity in the field of either one or both health behaviours, experts in smoking cessation and/or PA-enhancement interventions, and smokers/individuals who are not sufficiently physically active. They will be asked to reflect on and discuss together the results of the scoping review to facilitate reporting of the findings and to inform future works in the field, including the further development of the *Perfect Fit* virtual coach. A detailed design of the consultation process will be created after stage five of the methodological framework (see above) has been completed.

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Supplementary Material 1: Search Strategy Developed for PubMed

("Identification, Psychological"[majr] OR "Social Identification"[majr] OR "identity"[ti] OR "Self Concept"[majr:noexp] OR "Self Concept"[ti] OR "self perception*"[ti] OR "self image*"[ti] OR "self view*"[ti] OR "sense of self"[ti] OR "sense of identity"[ti] OR "sense of identities"[ti] OR "Social Identification"[majr] OR "Social Identification"[ti] OR "self identity"[ti] OR "self identities"[ti] OR "social identity"[ti] OR "social identities"[ti] OR "identity formation*"[ti] OR "identity maintenance"[ti] OR "identity change*"[ti] OR "identity process*"[ti] OR "identity related intervention*"[ti] OR "self conception"[ti] OR "self conceptions"[ti] OR ("identit*"[ti] AND ("construct*"[ti] OR "chang*"[ti] OR "creat*"[ti])) OR "self schema"[ti] OR "self schemata"[ti] OR "self schema*"[ti] OR "selfschema"[ti] OR "selfschemata"[ti] OR "selfschema*"[ti] OR "self definition"[ti] OR "self defin*"[ti] OR "selfdefinition"[ti] OR "selfdefin*"[ti] OR "possible self"[ti] OR "possible selves"[ti] OR "possible self*"[ti] OR "possible selv*"[ti] OR "future self"[ti] OR "future selves"[ti] OR "future self*"[ti] OR "future selve*"[ti] OR "prototype self"[ti] OR "prototype selves"[ti] OR "prototype self*"[ti] OR "prototype selv*"[ti])

AND ("Smoking"[majr] OR "Smoking"[ti] OR "Smoking Cessation"[majr] OR "Smoking Devices"[majr] OR "cigar"[ti] OR "cigars"[ti] OR "cigarette"[ti] OR "cigarettes"[ti] OR "tobacco"[ti] OR "smoker"[ti] OR "smoker*"[ti] OR "smokers"[ti] OR "smoking behavior*"[ti] OR "smoking behaviour*"[ti] OR "tobacco use cessation*"[ti] OR "nicotine use cessation"[ti] OR "quitting smoking*"[ti] OR "quit smoking*"[ti] OR "stop smoking*"[ti] OR "smoking reduction"[ti] OR "smoking abstinence"[ti] OR "cessation"[ti]

OR "Exercise"[majr] OR "Exercise"[ti] OR "Exercis*"[ti] OR "Physical Activity"[ti] OR "Physical Activit*"[ti] OR "Physically Activ*"[ti] OR "Physical Inactivit*"[ti] OR "Physically Inactiv*"[ti] OR "physical exercise*"[ti] OR "Sports"[majr] OR "sports"[ti] OR "sport"[ti] OR "Physical Fitness"[majr] OR "Athletic Performance"[majr] OR "fitness"[ti] OR "physical training"[ti] OR "athletic activity"[ti] OR "Athletic Performance"[ti])

NOT ("Animals"[mesh]

NOT "Humans"[mesh])

Search strategies developed for the PsycINFO, Embase, Emcare, Web of Science Core Collection, Wiley Cochrane Library, Psychology, Behavioural Sciences Collection and Academic Search Premier, OpenGrey.eu and British Library EthOS databases are available upon request.

CORRECTION: MAPPING THE EVIDENCE ON IDENTITY PROCESSES AND IDENTITY-RELATED INTERVENTIONS IN THE SMOKING AND PHYSICAL ACTIVITY DOMAINS: A SCOPING REVIEW PROTOCOL

This article was previously published with two errors. The reference citation 32 in 3rd paragraph of the Introduction section mistakenly referred to an empirical article published by Dr. Tombor in the same year instead of the intended meta-ethnography. The correct reference (below) has now been included in the article.

Tombor I, Shahab L, Herbec A, et al. Smoker identity and its potential role in young adults' smoking behavior: a meta-Ethnography. Health Psychol 2015;34:992–1003.

The second error pertains to two arguments made on the basis of the meta-analysis by Rhodes et al in 2016 in third paragraph of the Introduction section. On review, it became apparent that the meta- analysis does not only review qualitative data, nor does it look at young adults and youth only. The sentence has therefore been corrected as follows:

However, these articles are either outdated [19] review primarily quantitative data [40] look only at young adults or youth [39] or study multiple addictive substances altogether [41].