Health Psychology Review

ISSN: 1743-7199 (Print) 1743-7202 (Online) Journal homepage: www.tandfonline.com/journals/rhpr20

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To cite this article: Melanie Bamert, Yves Schaffter, Fanny Bally, Daryl B. O'Connor & Jennifer Inauen (22 Aug 2025): Assessment of stress and its relationship with health behaviour in daily life: a systematic review, Health Psychology Review, DOI: 10.1080/17437199.2025.2534000

To link to this article: https://doi.org/10.1080/17437199.2025.2534000

HEALTH PSYCHOLOGY REVIEW
https://doi.org/10.1080/17437199.2025.2534000

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Assessment of stress and its relationship with health behaviour in daily life: a systematic review

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ABSTRACT

Stress influences health behaviours critical for preventing non-communicable diseases. Although research on the stress-health behaviour relationship in daily life has grown, a synthesis of measures and findings is lacking. This systematic review examines stress measures used in intensive longitudinal studies in daily life, their reliability and associations with health behaviours. We included studies measuring self-reported (cognitive appraisal-based) or physiological stress in daily life alongside health behaviours including eating, physical activity, smoking, and alcohol consumption. We excluded studies on physical stress, mood, laboratory-induced stress, non-English publications, and animal studies. Study quality was assessed using the Effective Public Health Practice Project Tool. Following PRISMA guidelines, we searched 2,333 records from PsycInfo, PubMed, and Web of Science, leading to 100 included studies with 18,122 participants. Narrative synthesis of results showed that self-reported stress measures dominated (94.5%), while physiological measures were underrepresented (5.5%). Stress was linked to unhealthier behaviours (30.2%), healthier behaviours (14.1%), or was not associated with health behaviour (55.7%), depending on conceptual, methodology, and sample characteristics. Notably, physiological stress predominantly correlated with healthier behaviours, while self-reported stress predominantly related to unhealthier behaviours. Low study quality limit comparability, highlighting the need for standardised reporting to improve future research on stress and health behaviour.

ARTICLE HISTORY
Received 17 April 2025
Accepted 9 July 2025

KEYWORDS
Stress; health behavior; measure; physiological; ecological momentary assessment

Introduction

Health behaviours play a critical role in determining our health. Engaging in a range of health behaviours can protect against non-communicable diseases such as cardiovascular disease (e.g., Khaw et al., 2008). Health behaviours can be divided into healthy behaviours, such as physical activity and a balanced diet, which support overall health, and unhealthy behaviours, such as smoking and alcohol consumption, which can be harmful (Lippke et al., 2012). Further, existing meta-analyses have identified key behaviours as major contributors to premature mortality and adverse health outcomes, including eating behaviour, physical activity, smoking, and alcohol consumption (Keeney, 2008; Murray et al., 2020). Despite these well-known benefits, many people struggle to engage in these health behaviours. According to reports from the World Health Organization, 10-30% of individuals smoke (World Health Organization, 2021) and 17% of people over 15 years old engage in heavy or binge drinking (World Health Organization, 2024). Moreover, only 20-30% of individuals

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/17437199.2025.2534000.

in the United States of America and Europe meet national physical activity guidelines (Rhodes et al., 2017) and about 40% of individuals in both high- and low-to-middle-income countries do not follow national dietary guidelines (Leme et al., 2021). Stress is a major barrier to health behaviour as it can negatively impact the self-regulatory resources necessary for maintaining these behaviours (e.g., Laborde et al., 2018; Thayer et al., 2009, 2012).

Stress and health behavior

Stress, a ubiquitous aspect of modern life, emerges when perceived demands exceed an individual's available resources (Lazarus & Folkman, 1984; Ursin & Eriksen, 2004). There are distinct aspects of stress (Segerstrom & O'Connor, 2012; Ursin & Eriksen, 2004) that can be investigated, such as stressors (i.e., stressful situations), the perceived stress experience, or the physiological stress response. The physiological stress response, our body's way of mobilising resources to cope with stress, happens both through activation of the hypothalamic–pituitary–adrenal axis and the autonomic nervous system (e.g., O'Connor et al., 2021; Weber et al., 2022). Under certain circumstances stress can enhance mental and physical performance and support essential biological functions, such as the immune response (Dhabhar, 2014, 2018; Laborde et al., 2018). However, stress is also frequently associated with negative health outcomes, including obesity, cardiovascular disease, and cancer (Karyotaki et al., 2020; Keller et al., 2012; O'Connor et al., 2021; Taouk et al., 2020). These adverse effects occur due to stress-induced dysregulation of biological processes, but also the influence of stress on health behaviours (O'Connor et al., 2021). Many cross-sectional studies have identified stress as an important factor relating to health risk behaviours such as a poor diet, physical inactivity, smoking and alcohol use in a variety of different populations (e.g., Algren et al., 2018; Beutel et al., 2018; Ng & Jeffery, 2003; Pelletier et al., 2016).

It is believed that stress influences health behaviour by negatively affecting the self-regulatory resources necessary for adaptive and goal-directed behaviour (Laborde et al., 2018; Thayer et al., 2009, 2012). Self-regulation plays a crucial role across different health behaviours, with executive functions such as updating (e.g., adjusting dietary choices based on new health information), inhibiting (e.g., resisting the urge to smoke when stressed), and shifting (e.g., adapting to a new workout routine after an injury) being essential for translating intentions and automatic responses into actual behaviours (Dohle et al., 2018). Stress can disrupt this process due to the significant overlap between brain regions responsible for the physiological stress response and executive functions, particularly in the prefrontal cortex (Thayer et al., 2009, 2012). Moreover, conscious and unconscious cognitive processes associated with stress, such as worry and rumination, can impair an individual's ability to self-regulate effectively (Brosschot et al., 2018; Clancy et al., 2016). This weakens goal-directed behaviour and behavioural adaptability (Laborde et al., 2018), both of which are essential for engaging in health behaviours (Kwasnicka et al., 2016; Rhodes & Lithopoulos, 2023). Additionally, individuals may turn to behaviours like unhealthy eating or smoking in an effort to cope with stress (e.g., Adam & Epel, 2007; Franja et al., 2021; Perski et al., 2022; Standen et al., 2022).

Until recently, the stress-health behaviour relationship has mainly been studied focusing on individual differences, using cross-sectional or panel designs (e.g., Ng & Jeffery, 2003; Steptoe et al., 1996), and in highly controlled settings such as laboratories (e.g., Epel et al., 2001; Zellner et al., 2007). However, these approaches overlook the dynamic nature of stress and health behaviours as they unfold in daily life. Stress fluctuates rapidly in response to everyday situational demands (e.g., Bamert & Inauen, 2022; Zawadzki et al., 2019), and these moment-to-moment variations are crucial for understanding how stress influences behaviours which can occur multiple times a day.

Studying stress and health behavior in daily life

Intensive longitudinal methods (e.g., ecological momentary assessment, daily diaries, ambulatory assessment) allow for the investigation of momentary experiences and behaviours as they unfold in real time within everyday contexts (Mehl & Conner, 2011; Trull & Ebner-Priemer, 2014). These methods offer advantages such as (1) studying processes in their natural context, enhancing ecological validity, (2) capturing experiences in real time, and (3) understanding how these processes unfold within individuals over time (Bolger & Laurenceau, 2013; Mehl & Conner, 2011). However, they also present challenges, including compliance issues, reactivity, participant burden, technical difficulties, and extensive data preparation requiring numerous methodological decisions (Shiffman et al., 2008).

In recent years, intensive longitudinal studies have increasingly been used to examine the stress–health behaviour relationship. While many studies report associations between stress and eating behaviour, physical activity, smoking, and alcohol consumption (e.g., Almeida et al., 2020; Hill et al., 2018; Mereish et al., 2022; Minami et al., 2011), findings are inconsistent. Some studies find no significant relationship (e.g., Reichenberger et al., 2021; Savoy et al., 2021; Wemm et al., 2022), while others suggest stress is linked to both unhealthier (e.g., smoking lapse: Cambron et al., 2019; binge drinking: Grzywacz & Almeida, 2008) and healthier behaviours (e.g., lower alcohol consumption; Helzer et al., 2006; O'Connor et al., 2009). Although it is plausible that stress relates differently to various types of health behaviours, this variation has not yet been systematically addressed in previous reviews.

Methodological variation contributes to these mixed findings. Study designs range from randomised controlled trials (e.g., Businelle et al., 2016; Mereish et al., 2018) to mixed methods research (e.g., Kwasnicka et al., 2021) and observational designs such as daily diary studies (e.g., Finkelstein-Fox et al., 2020; O'Connor et al., 2008). Stress measurement frequency differs across studies, from one prompt per day (e.g., Hill et al., 2023; Park et al., 2023) to eight prompts per day (e.g., Jones et al., 2017; Schilling et al., 2022). The level of analysis also varies, with some studies employing multiple assessments per day (e.g., Almeida et al., 2020) and others using monthly assessments (e.g., Cadigan et al., 2021).

Conceptual and methodological challenges further complicate research on the stress–health behaviour relationship. Stress can be assessed in multiple ways, such as exposure to stressors, perceived stress, or physiological stress (Ursin & Eriksen, 2004), each of which may yield different associations with health behaviours. Additionally, studies differ in their handling of within- and between-person effects and their choice of time scales (e.g., hourly, daily), which can influence findings. Technical and practical challenges, including data aggregation decisions and participant compliance, further contribute to inconsistencies across studies. Differences in study populations (e.g., healthy individuals vs. those with specific health conditions) add another layer of complexity. Moreover, temporal factors such as how often and at what times stress is assessed or how frequent a certain health behaviour happens (e.g., vigorous physical activity) could affect the ability to detect meaningful associations with health behaviour. This question of timing is also a basis for interventions targeting the stress-health behaviour relationship in daily life.

For stress measures to be suitable for investigating or intervening in the stress–health behaviour relationship in daily life, they must be both valid and feasible for real-time use. A key challenge is balancing accuracy with participant burden, as frequent assessments and lengthy self-report measures can reduce compliance and data quality (e.g., Bos et al., 2019; Eisele et al., 2022). Passive physiological measures such as heart rate variability (HRV) or electrodermal activity provide lower-burden alternatives while still capturing meaningful stress fluctuations but the need to carry and charge devices, and the visibility of wearable sensors could compromise compliance. Careful selection of covariates is also essential, as including too many may increase participant burden, while omitting key variables may limit interpretability. Contextual factors (e.g., time of day, social interactions) and individual differences (e.g., trait stress reactivity, baseline health behaviours) should be carefully considered to ensure a comprehensive understanding of the stress–health behaviour relationship. Finally, analytical decisions, such as handling missing data and distinguishing within- from between-person effects, can significantly impact findings and should be transparently reported to improve study comparability.

Aim of this systematic review

Despite the growing use of intensive longitudinal methods to study the stress-health behaviour relationship, there is considerable variability in findings that could be due to differences in stress assessment, time scales, analytic approaches, and study populations. While there is research synthesising the measurement of health behaviour in daily life contexts (e.g., in regards to measurement reactivity: König et al., 2022), and prior reviews have focused on the association between stress and specific health behaviours individually (e.g., eating behaviour: Hill et al., 2022; smoking: Torres & O'Dell, 2016; alcohol: Becker, 2017; physical activity: Stults-Kolehmainen & Sinha, 2014), a comprehensive overview of how stress is measured when studying the stress-health behaviour relationship in daily life is missing as is an overview of the factors influencing these associations, and the implication for real-time interventions. This systematic review aims to provide an overview of how the relationship between stress and health behaviour is investigated in daily life, and to present recommendations for the field. Specifically, we are interested in the key health behaviours that have been linked to premature deaths globally such as (1) eating behaviour, (2) physical activity, (3) smoking, and (4) alcohol consumption (Keeney, 2008; Murray et al., 2020). As preregistered on PROSPERO (CRD42023397663), we aimed to investigate (1) which measures of stress have been used to investigate the relationship between stress and health behaviour in daily life, (2) the reliability of these measures, (3) the magnitude and (4) the variability in the associations between stress measures and health behaviours, (5) and which covariates were controlled for. The results from these research questions will further be discussed in terms of how suitable the reviewed measures are for guiding ecological momentary interventions that focus on the relationship between stress and health behaviours.

Methods

This systematic review included intensive longitudinal studies investigating the relationship between stress and key health behaviours important for health outcomes (Keeney, 2008; Murray et al., 2020), including (1) eating behaviour, (2) physical activity, (3) smoking and (4) alcohol consumption. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Page et al., 2021).

Inclusion criteria

Two key measurement domains were essential for inclusion: first, either a self-reported stress measure incorporating cognitive appraisal of stress (Hill et al., 2022) or a physiological stress measure had to be included (e.g., cortisol, HRV). Cognitive appraisal refers to individuals' subjective evaluation of a recent or ongoing event, load, or stimuli as threatening, harmful, or challenging (Lazarus & Folkman, 1984), leading to the stress response (stress experience and physiological stress response; Lazarus & Folkman, 1984; Ursin & Eriksen, 2004). For example, studies using checklists that assess both the occurrence of stressors and participants' appraisal of those events (e.g., the Daily Inventory of Stressful Events, DISE; Almeida et al., 2002) are eligible. In contrast, studies that only record the occurrence of daily events without assessing perceived stressfulness (e.g., noting an 'argument with partner' without appraisal) do not meet this inclusion criterion. Second, one or more of the following four health behaviours had to be assessed: eating behaviour, physical activity, smoking, or alcohol consumption. To qualify as intensive longitudinal, studies needed to include repeated assessments of both stress and health behaviour in daily life (at least two time points each), conducted in naturalistic settings using methods such as ecological momentary assessment, ambulatory assessment, or daily diaries. We only included quantitative studies. Stress measures had to reflect short-term experiences (i.e., not trait or chronic stress) and be assessed prior to or concurrently with health behaviours. We applied a 30-day upper limit for stress measurement, acknowledging the lack of consensus on when stress becomes chronic. This cut-off was chosen to retain studies that repeatedly captured ecologically valid stress experiences over time.

Exclusion criteria

Reports were excluded if they were preprints. Reports were also excluded if they only assessed physical stress (e.g., stress from physical exertion), measured general mood states or negative affect rather than perceived stress, or only induced stress in a laboratory setting. Non-English language studies, animal studies, and those that did not analyze or report the stress-health behaviour relationship were also excluded.

Search method to identify suitable studies

A comprehensive literature search was conducted using three databases: PsycInfo (Ovid), PubMed, and Web of Science. The initial search was performed on May 8, 2023, with no restrictions on publication dates. The search terms were developed through a systematic process of identifying key words and phrases, which involved both scanning relevant literature and consulting experts in the field (DOC and JI). The full search terms can be found in the supplementary material (S1). The initial search yielded 809 records from PsycInfo, 464 from PubMed, and 1,267 from Web of Science. Duplicate records were eliminated using Zotero software (Corporation for Digital Scholarship, 2024), followed by manual screening. A total of 2,015 unique records remained for review.

On September 13, 2024, the search was updated using the same search terms on the same databases. 285 unique and new records were found and screened for inclusion. Lastly, to identify foundational studies that may have been missed in the initial database searches, a backward citation search was performed for the eight records that were both highly relevant to answer at least one of our research questions and contained a stress measure that was reported by the study authors to be reliable.

Data collection and analysis

Selection of studies

Three reviewers (YS, AH, LB) initially screened the records for inclusion in the review. At first, 400 records (~20% of all records) were randomly chosen to be triple screened to establish interrater reliability (Landis & Koch's Kappa: 0.73). All records were rated as either included, excluded, or unclear. Wherever there was a discrepancy, or ratings were unclear, it was resolved by screening the full text or discussing with MB, or where necessary with DOC and JI. Where not enough information was gained from the report, study authors were contacted. For all records, title, abstract, and the methods section were screened. Methods screening was performed for all records because much of the information necessary for assessing eligibility was found therein (e.g., if data were collected in daily life, timing of data collection, the exact wording of items measuring stress). The entire research team assessed whether the self-reported stress measures included cognitive appraisal of stress (similar to other systematic reviews on stress e.g., Hill et al., 2022).

The screening for the updated search and the backward citation screening were conducted by one single reviewer (YS) in the same manner as for the initial screening. Unclear records were discussed with MB or where needed with JI. New stress measures were discussed between YS and MB.

Records were excluded based on the following criteria, applied in hierarchical order: full text was unavailable; details remained unclear and information could not be obtained from study authors; records were retracted or preprints; records were not written in English; participants in the study were not human; studies were not quantitative; stress and health behaviour were not measured in the study; stress and health behaviour were not measured in daily life; stress self-report did not include a cognitive appraisal; measures of stress and health behaviour were not repeatedly assessed;

stress was only operationalised as physical stress; stress measure was actually mood (e.g., negative affect); health behaviour was not measured at the same time or after stress; stress and health behaviour measurements were assessing timeframes longer than 30 days (chronic stress); stress – health behaviour relationship was not analyzed or reported.

Data extraction and management

An Excel form was created to extract data from the studies by MB and FB, incorporating feedback from DOC and JI. FB extracted key study characteristics, including author names, year of publication, article title, study design information (e.g., study duration), sample information (e.g., age, education), information about stress measures (e.g., rationale, stress aspect measured), health behaviour (e.g., type of behaviour, measurement), participant burden (e.g., prompt frequency, actions to minimise burden), study quality, and limitations named by authors (e.g., bias specific to stress). MB extracted information on the statistical analysis and results (e.g., data preparation steps, models calculated, size and significance of effects). Uncertainties were discussed together by FB, MB and where necessary with JI. While this data form included a coding scheme for information about the extent to which the reviewed measures are suitable for informing ecological momentary interventions targeting the relationship between stress and health behaviours, it was not unique enough and largely overlapped with other research questions, preventing additional meaningful extractions.

Quality appraisal

Due to the large variability in study designs, outcome measures, and the absence of an appropriate risk of bias tool for intensive longitudinal studies, we opted to conduct a study quality appraisal instead of a formal risk of bias assessment, following the approach of previous systematic reviews (e.g., Hill et al., 2022). To assess study quality, we used the Effective Public Health Practice Project (EPHPP) quality assessment tool (Effective Public Health Practice Project: Jackson & Waters, 2005) on the study level, where we excluded the category on study design because the named designs were not fitting for intensive longitudinal studies. Selection bias is rated strong (i.e., low risk of bias) only if participants are randomly selected and participation rates exceed 80%, which is rarely achievable in intensive longitudinal studies relying on convenience samples. Confounders require no group differences and control of at least 80% of relevant confounders, yet intensive longitudinal studies often focus on within-person processes rather than between-group comparisons. Blinding assumes participants and assessors are unaware of the research question. Data collection methods are rated strong if studies report reliability and validity for all measures, which many intensive longitudinal studies do not report. We considered measures 'strong' when they were unadapted, psychometrically sound instruments with established use in daily life research, even if not revalidated in the study itself. Reliability and validity were considered particularly important for intensive longitudinal studies, where measures must be appropriate for repeated, within-person assessments. We applied a generous coding approach: if authors stated that a measure was reliable or based on a previously validated instrument, we accepted this even if no psychometric indices (e.g., Cronbach's alpha) were reported, while noting that this may overestimate actual measurement quality in daily life settings. Measures were rated as 'weak' when they involved single items or adaptations of validated scales (e.g., changes in item wording or timescale) without revalidation in the context of intensive longitudinal designs. Withdrawals and drop-outs are assessed based on full study completion by over 80% of participants. The overall study quality was predominantly rated as weak, with 61.1% of studies falling into this category and 5.4% being classified as strong. Selection bias was a common concern, with 85.9% of studies rated as weak. The reliability and validity of stress and health behaviour measures were also frequently rated as weak (65.2% for stress and 68.5% for health behaviour). While withdrawals and dropouts were more evenly distributed, nearly half of the studies (47.8%) received a weak rating in this domain. A more detailed breakdown of study quality ratings according to the EPHPP quality assessment can be found in the supplementary material (see S2, Table SI for a summary and Table SII for ratings per record). Additionally, we extracted information based on multiple intensive longitudinal study reporting guidelines (e.g., Adapted STROBE Checklist for Reporting Ecological Momentary Assessment Studies, CREMAS; Liao et al., 2016) such as additional information on training of participants, ecological momentary assessment procedure, or the time allowed to answer prompts (see S2, Table SIII-SV in the supplementary material). While many records did not report on these, available information is described in the results section.

Data synthesis

In this systematic review, the record level refers to individual database entries (i.e., published manuscripts), the study level represents distinct research projects (i.e., empirical studies), study samples are the groups of participants within each study from whom data were collected, and analyses are the statistical models used to investigate the stress-health behaviour relationships within the records. For each record, relevant coefficients from analyses (e.g., standardised beta coefficients, odds ratios, rate ratios, f-statistics, or unstandardised model estimates) relating to the stress-health behaviour relationship were extracted by MB and all uncertainties were discussed with JI. Where necessary, unstandardised estimates were transformed into odds or rate ratios. A rate ratio expresses how the rate of an event changes with a one-unit increase in a predictor, where values above one indicate a percentage increase and values below one a percentage decrease in the event rate (Atkins et al., 2013). If the effect size of coefficients, such as standardised beta coefficients, fell outside a plausible range (e.g., betas exceeding 1 or falling below −1), we only used it to determine the direction but not magnitude of the association between stress and health behaviour. Records only reporting Pearson correlations did not appropriately consider repeated measurement points nested within participants and were often done with raw scores, violating statistical assumptions. Therefore, these were not synthesised in this review.

For addressing our research questions on the magnitude, variability, and predictive validity of the stress–health behaviour association, we included multiple statistical models within each study, when available, to account for important differences in statistical analyses, such as whether within- and between-person effects were disentangled and the time scale used. This approach ensured a more comprehensive understanding of how methodological choices influence results, rather than limiting the synthesis to a single model per study sample.

Data pre-processing

To investigate the direction of relationship between stress and health behaviours in the included records, we recoded the result for analyses when needed, so that a positive relationship means greater stress relating to unhealthier behaviour. This ensures that for synthesising the results, a greater coefficient relates to unhealthier behaviour. Results for healthy behaviours, including fruit and vegetable intake, healthy snacking, healthy eating, consuming main meals, physical activity (amount, duration, frequency), smoking abstinence were thus recoded. In turn, results on unhealthy behaviours were left as originally scored, i.e., those regarding dietary lapses, (unhealthy) snacking, consuming unhealthy foods, disordered eating, binge eating, eating tempting food, overeating, loss of control eating, restricted eating, emotional eating, meal skipping, physical inactivity (e.g., sedentary behaviour), number of cigarettes, smoking instances, smoking lapses, alcohol consumption (frequency, amount) and heavy/binge drinking.

Identifying duplicate samples

Duplicate samples within the included records were identified by FB and YS by documenting instances with the same parent study. Further, if sample demogaphics and size were identical and there was an overlap in authorship, it was recorded as a duplicate sample. If two records came from the same parent study but reported different sample information (e.g., age), we used the information from the larger sample to describe the study sample.

Narrative synthesis

A meta-analysis was not conducted, because of significant variability in study designs, stress measures and health behaviour outcomes as well as the lack of information reported in records. Instead, we descriptively summarised the characteristics and quality of the included records, ecological momentary assessment designs and study samples to answer the six research questions. First, to explore the measures of stress used, we summarised the number and types of self-reported and physiological stress measures on study level. This included the use of active (e.g., self-report via questionnaires; Fowler et al., 2023; Schilling et al., 2022) versus passive (e.g., HRV measured with wearables or patches; Mahoney et al., 2023; Ranzenhofer et al., 2022) stress measures (Wenze & Miller, 2010). The stress measures used were then summarised according to the stress aspects assessed (i.e., stressors, perceived stress, physiological stress; Ursin & Eriksen, 2004). Physiological measures were additionally connected to the distinction between measures of hypothalamic–pituitary–adrenal axis and autonomic nervous system activity (e.g., O'Connor et al., 2021; Weber et al., 2022). Second, the reliability of these stress measures was reported at study level. Third, the magnitude in the associations between stress and health behaviours was described on the level of analysis both for each specific health behaviour and overall. Fourth, the variability in these associations on analysis level was summarised according to sample (health status, body mass index), conceptual (the stress aspect investigated), and methodological characteristics (the type of self-report questionnaire used, the characteristics of the statistical analysis). Additionally, moderators that were tested in the included studies were divided into interindividual and time-varying factors and thematically grouped (bottom up). Fifth, we summarised and thematically grouped (bottom up) which and how many covariates were controlled for in the statistical analyses. To avoid duplication, information on the suitability of stress measures for informing ecological momentary interventions targeting the relationship between stress and health behaviours was not synthesised separately. Instead, it was integrated into the discussion, drawing on findings from other research questions.

Results

A total of 100 records including a total of $N = 18{,}122$ participants across 92 studies were included in this review (see supplementary material S8 for the full list of included records). See Figure 1 for the flow diagram of study selection. Data supporting the findings of this systematic review are available in the supplementary material (see S3, Table SVI). Studies often only reported bivariate correlations between stress and health behaviours or did not analyze the relationship at all (e.g., Aronson et al., 2008; Clevers et al., 2020; de Vries et al., 2022). Additionally, some studies were excluded because they examined combinations of health behaviours (e.g., alcohol and drug use) and did not report the stress–health behaviour relationships separately (e.g., Linden-Carmichael et al., 2022).

Of the included studies, most were observational ($n = 79$, 85.9%) and about half of all studies were conducted in the United States of America ($n = 49$, 53.3%). There was high variability in study duration (between 1–730 days). The median sample size per study was 116 participants. Study participants had a median age of 35.5 years, and a median of 57% participants were women. More information on the studies included and the study samples (e.g., country of data collection, study duration, health status of the study samples) are summarised in the supplementary material (S2, Table SV).

Concerning the statistical analyses, the majority of analyses comprised multilevel analysis ($n =$ 286, 71.3%) to investigate the stress-health behaviour relationship, due to the nested structure of the data (repeated measures nested within participants; see supplementary material S4, table SVII for a list of analyses used). Across all analyses, 249 (62.1%) were done concurrently (no lag) and 152 (37.9%) were lagged analyses, where stress was used to predict future health behaviour. For the level of analysis, about half of the analyses used the day ($n = 218$, 54.4%), followed by multiple

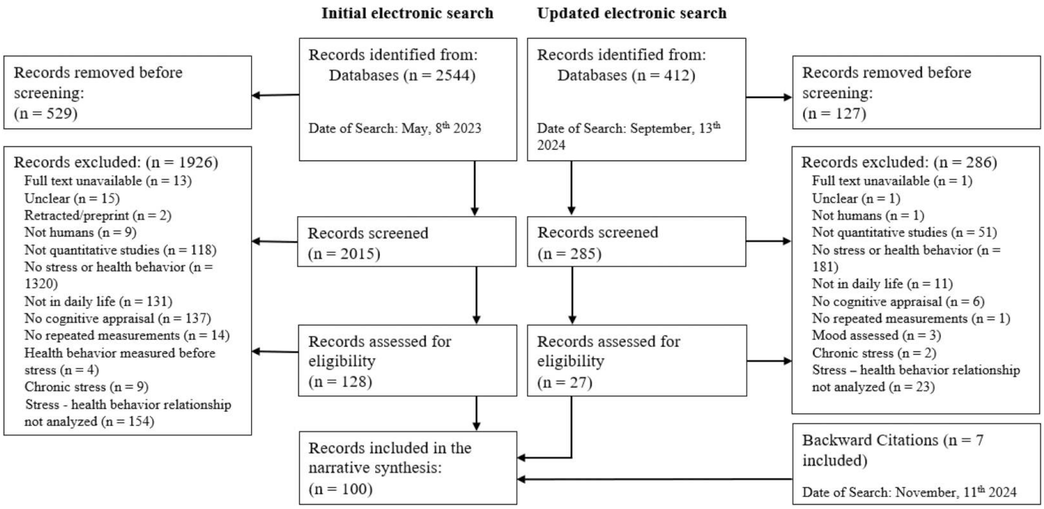

Figure 1. Flow diagram of included studies.

Note: Unclear = details about report/study remained unclear and information could not be obtained from study authors, records removed before screening are duplicate records.

times a day used in 118 of analyses (29.4%). There was considerable variation in modelling choices, such as inclusion of random slopes or intercepts, and distinguishing within- and between person variances by centreing (See S3, Table SVI in the supplementary material).

Fiftynine (64.1%) studies had an empirical rationale for using an intensive longitudinal study design to investigate their research question. 18 (19.6%) studies gave some other rationale (e.g., authors explanation) and one study (1.1%) had a mix of empirical and theory-based rationale. 14 (15.2%) studies did not report their rationale. Concerning the rationale for the specific timing and frequency of assessments in daily life that studies used, 21 (22.8%) had an empirical rationale and 16 (17.4%) gave some other rationale (i.e., authors explanation). 55 studies (59.8%) gave no rationale, and no study had a theory-based rationale.

Of the included studies, 32 (34.8%) investigated eating behaviour, 21 (22.8%) alcohol consumption, 14 (15.2%) smoking, 15 (16.3%) physical activity, and 10 studies (12.9%) investigated multiple of these health behaviours. Of the studies investigating eating behaviour, five (12.5%) investigated energy/food intake (e.g., participants had to report on how much they had eaten; Reichenberger et al., 2021), four (10.0%) investigated unhealthy or healthy eating (e.g., participants estimated the healthiness of their last meals, Schultchen et al., 2019; participants reported the number of times they ate sweet or salty snacks over the past day, Finkelstein-Fox et al., 2020), seven (17.5%) investigated snacking (e.g., participants reported the amount and type of each snack they consumed from the time of waking up to before going to bed; Sezer & Öner, 2023), 13 (32.5%) investigated clinically relevant eating behaviour (binge eating, loss-of-control eating, disordered eating; e.g., participants were asked to indicate whether or not they had experienced a binge episode at each assessment; Fischer et al., 2017), two (5.0%) other (comfort eating, lapses; e.g., participants had to report if a dietary lapse occurred since the last survey; Goldstein et al., 2018), and nine (22.5%) investigated multiple aspects of eating behaviour (e.g., Hsu & Raposa, 2021; Smith et al., 2021).

Of the studies looking at physical activity, nine (39.1%) looked at physical activity (amount/bouts) (e.g., participants' physical activity was passively measured using a chest-worn device; Almeida et al., 2020), four (17.4%) at moderate to vigorous physical activity (amount/bouts) (e.g., participants reported duration (in minutes) of engagement in different physical activities; Dunton et al., 2009), two (8.7%) at sedentary time (e.g., sedentary behaviour was objectively measured with a wrist-worn device; Diaz et al., 2018), and seven (30.4%) at multiple aspects of physical activity (e.g., Jones et al., 2017).

In the smoking studies, five (31.3%) looked at smoking (e.g., participants indicated if they smoked the previous day; Braitman et al., 2021), four (25.0%) at number of cigarettes consumed (e.g., participants reported the number of cigarettes smoked each day; O'Connor et al., 2009), two (12.5%) at smoking events (e.g., participants had to report smoking events immediately prior to smoking; Beckham et al., 2008), two (12.5%) at smoking abstinence or status (e.g., smoking abstinence was measured both with self-report and carbon monoxide testing; Spears et al., 2019), and three (18.8%) looked at smoking lapses (e.g., participants reported all their smoking lapses; Shiffman et al., 2020).

Lastly, for alcohol consumption 12 (46.2%) studies investigated the amount of alcohol consumed (e.g., participants reported their alcohol consumption from the previous day, including the number of beers, liquor-based drinks, and glasses of wine; Helzer et al., 2006), nine (34.6%) alcohol consumption (yes/no, e.g., participants reported if they consumed alcohol during the past 24 h; Park et al., 2023), one (3.8%) heavy drinking (participants were asked to report the previous months heavy episodic drinking frequency; Cadigan et al., 2021), and three (11.5%) investigated multiple aspects of alcohol consumption (e.g., Luk et al., 2018).

Use of stress measures and their reliability

This section presents the results for the first two research questions: (1) which measures of stress have been used to investigate the relationship between stress and health behaviour in daily life, and (2) the reliability of these measures. A large majority of studies used self-report measures of stress ($n = 87$, 94.6%), with only few studies using physiological measures ($n = 2$, 2.2%), or a combination of both ($n = 3$, 3.3%). 14 studies (15.2%) measured stressors, 51 (55.4%) the stress experience, two (2.2%) the physiological stress response, and 25 studies (27.2%) measured multiple aspects of stress. For self-report measures, only 23.3% ($n = 21$) of studies reported on the reliability of the measure used, whereas 76.7% ($n = 69$) of studies did not report on reliability. For physiological stress measures, 20.0% ($n = 1$) of studies reported their measure to be reliable, the other studies (80.0%, $n = 4$) did not report on reliability. All studies that reported on reliability of stress measures reported good reliability (see S2, Table SI in the supplementary material).

The studies included in this review employed various strategies and frequencies to prompt stress assessments (see S5, Table SIX in the supplementary material). The most common prompting strategy was interval-based sampling, used in 44 studies (47.8%), where participants were asked to report their stress at fixed time intervals. (Semi-)random signal-based prompting was used in 19 studies (20.7%), ensuring that stress reports were collected unpredictably throughout the day. Event-based prompting, in which participants were asked to report stress following specific events, was used in four studies (4.3%), while device-based prompting, triggered by physiological or contextual data from a wearable device, was used in two studies (2.2%). Additionally, 21 studies (22.8%) combined multiple prompting strategies, and three studies (3.2%) did not report their prompting approach.

Regarding sampling frequency, most studies collected stress data multiple times per day ($n = 50$, 54.3%), allowing for fine-grained analyses of stress fluctuations. Another 35 studies (38.0%) used a daily assessment schedule, while three studies (3.3%) assessed stress weekly. A small number of studies ($n = 2$, 2.2%) used continuous measures, where stress was assessed passively or near-continuously through physiological monitoring (see the supplementary material S5, Table SVIII for information on prompting strategy and sampling frequency).

Median percentage of missing data was 7.1% per intensive longitudinal study (Q1 = 3.8%, Q3 = 16.9%). 64 studies did not report percentage of missing data. As reasons for missing data, three studies (3.3%) reported device detection failure, 11 (12.0%) human errors, and three (3.3%) reported (other) technical problems. Concerning reasons for non-compliance of participants, two studies (2.2%) reported forgetting to wear or charge sensors and two studies (2.2%) reported too high burden of diaries. Further reasons that were mentioned by one study each (1.1%) were forgetting the smartphone at home, not receiving diary prompts during 'do not disturb mode', medical issues, or loss of diary forms.

In the following sections, we provide a more detailed overview of the self-report and physiological measures, and which stress aspect they analyzed (see Table 1). There was considerable variation in self-report measures of stress, including the adaptations that were made (e.g., adapting to daily life context), response options, scale type and range, and the number of items used. This and information about the sources of questionnaires can be found in the supplementary material (see S6, Table SX).

Stressful event questionnaires

Twenty-eight studies (31.1%) used questionnaires about stressful events or daily hassles such as asking participants to select from a list of stressful or unpleasant experiences (checklists) or to write down the stressful events they experienced (open format), and to then rate the stressfulness

Table 1. Self-report stress measures according to the studies.

Questionnaire type	Stress aspect	Operationalisation of stress aspect	Example item or description	Number of analyses per operationalised aspect
Stressful events questionnaires	Stressor	Number of stressful events (checklist)	Which of the following events made you feel stressed today?; the sum of checked boxes from the checklist was calculated	25 (20.7%)
	Stressor	Number of stressful events (open format)	Participants were asked to record any stressful experience they encountered that day (up to 5 daily hassles); the sum of hassles was calculated	18 (14.9%)
	Stressor	Type of stressor	Stressors were coded into categories such as interpersonal, work/academic, …	24 (19.8%)
	Stressor and stress experience	Experience of stressors	Participants rated the most stressful event from each assessment interval according to how stressful they found it to be.	54 (44.6%)
Perceived stress scale and adaptations	Stress experience	Perceived stress/ helplessness	How often did you feel difficulties were piling up so high that you could not overcome them today?	9 (18.4%)
	Stress experience	Perceived self-efficacy	How often did you feel confident in your ability to manage your stress today?	16 (32.7%)
	Stress experience	Combination of perceived helplessness and self-efficacy	Items from both scales were combined.	24 (49.0%)
Single items	Stressor	Occurrence of stressful event	Did stressful events occur in the past 2 h? (yes or no)	19 (11.0%)
	Stress experience	Experience of stressors	Participants indicated whether they thought stress had triggered the health behaviour.	2 (1.2%)
	Stress experience	Perceived stress	How stressed have you been since the previous prompt?	135 (78.5%)
	Stress experience	Perceived self-efficacy	I can manage with all the things I have to do right now.	16 (9.3%)
Other	Stress experience	Experience of stressors	Have you seen a media image about food, shape, or weight? If yes: How stressful was it to see this image?	6 (25.0%)
	Stress experience	Perceived stress/ helplessness	Did you feel stress when you saw reflection of self?	6 (25.0%)
	Stress experience	Perceived self-efficacy	Thing are working out as I have planned right now	10 (41.7%)
	Stress experience	Combination of perceived helplessness and self-efficacy	Items from both scales were combined.	2 (8.3%)

Note: The frequency per questionnaire column describes the frequency with which each questionnaire was used to investigate (i.e., analyze) the association between a specific stress aspect and health behaviour.

of these experiences. Examples of such stressful events checklists were the assessment of daily experience (Stone & Neale, 1982; e.g., Armeli et al., 2000), or the daily stress inventory (DSI, Brantley et al., 1987; e.g., Fowler et al., 2023). These checklists involved longer lists of potentially stressful events such as the daily stress inventory with 58 items for which participants indicated the perceived stressfulness for the events that occurred during a specified timeframe (most of the time day level). On the other hand, open format questionnaires about stressful events, oftentimes called daily hassles, involved participants to first list a certain number (between 3-5) of stressful or unpleasant events they experienced during the day in a short text description and to then rate the stressfulness of each event.

Of the analyses run within the studies using questionnaires about stressful events, the association between the stressor aspect and health behaviour was often analyzed. Either the number of reported stressors was analyzed using the sum of checked boxes for checklists (*n* = 25, 20.7%) or the sum of hassles described in open format (*n* = 18, 14.9%), or the types of stressors were analyzed (*n* = 24, 19.8%). In studies that investigated the types of stressors, categorisation of events was done by coders (e.g., into ego-threatening, interpersonal, work/academic, physical or other stressors; Hill et al., 2023). Lastly, some analyses used these questionnaires to investigate a combination of stressor and stress experience aspects (*n* = 54, 44.6%), by using the stressfulness rating of the most stressful event (e.g., Armeli et al., 2000) or by averaging the stressfulness ratings of all reported stressful events (e.g., Fowler et al., 2023).

Perceived stress scale

Further, 13 studies (14.4%) used the perceived stress scale (PSS, Cohen et al., 1983 e.g., Dunton et al., 2017) and adaptations thereof, which consists of a subscale for (1) perceived helplessness (e.g., How often did you feel difficulties were piling up so high that you could not overcome them today?) and (2) perceived self-efficacy in dealing with stress (e.g., How often did you feel confident in your ability to manage your stress today?) (Harris et al., 2023).

Of the analyses run within the studies using the PSS and its adaptations, some investigated the stress experience aspect (*n* = 9, 18.4%) but oftentimes they investigated a combination of the stress experience and self-efficacy (*n* = 24, 49.0%) or even only the items on self-efficacy (*n* = 16, 32.7%).

Single items and other

Single items were the most frequently used to assess stress on the study level (*n* = 43, 47.7%). Most of these single items used by studies were self-generated (*n* = 27, 64.3%; e.g., 'At the moment, I feel stressed out', Doerr et al., 2017). In other studies the single items were adapted from other questionnaires, such as using the 'stressed' item from the positive and negative affect scale (PANAS, Watson et al., 1988; e.g., Beckham et al., 2008; Coffman et al., 2021) or individual items from the PSS (Cohen et al., 1983; e.g., Li et al., 2020; Sheng et al., 2023) such as 'Right now, how nervous and stressed do you feel?' or 'Right now, you feel out of control of important things in your life'. Single items were used to analyze the relationship between different stress aspects and health behaviours (see Table 1).

Of the analyses run within these studies using single items, the stress experience aspect was most often analyzed (*n* = 135, 78.5%) with items such as 'How stressed have you been since the previous prompt?'. Some analyses also investigated stressors (*n* = 19, 11.0%) with dichotomous items on the occurrence of stressful events (e.g., 'Did stressful events occur in the past 2 h?'; Minami et al., 2018). One study also used a combined single item to assess stressors and stress experience, asking participants to indicate whether they believed a stressor had triggered a behaviour (e.g., smoking). Lastly, some single items assessed a combination of the stress experience and coping, such as self-efficacy in managing stress ('I can manage with all the things I have to do right now') which made up 9.3% (*n* = 16) of analyses.

Lastly, three studies (3.3%) used other items to assess specific types of stress such as appearance-related stress (e.g., 'Did you feel stress when you saw reflection of self'; Mason et al., 2018). In the analyses run within these three studies, most often self-efficacy in coping with stress was investigated ($n = 10$, 41.7%), followed by the stress experience aspect ($n = 6$, 25.0%), a combination of stressor and stress experience aspects ($n = 6$, 25.0%), or a combination of the stress experience aspect and coping with stress ($n = 2$, 8.3%). Finally, some studies also assessed multiple questionnaires ($n = 3$, 3.3%%; but then ran separate analyses).

Physiological measures

Of the five studies (5.4%) including physiological measures, two studies each included HRV (28.6%), heart rate (HR) (28.6%), or the cortisol awakening response (28.6%). One study included mean daily cortisol levels (14.3%). To measure HRV and HR, studies used fitbit (Cook et al., 2022) garmin (Mahoney et al., 2023) or medical grade devices (Ranzenhofer et al., 2022). Salivary cortisol was measured using salivette tubes (Moss et al., 2021; Naya et al., 2021). Of the physiological measures, HR (e.g., Ranzenhofer et al., 2022) and HRV (e.g., Cook et al., 2022) are considered measures of autonomic nervous system activity, whereas the cortisol awakening response (e.g., Naya et al., 2021) and mean daily cortisol levels (Moss et al., 2021) are measures for hypothalamic–pituitary–adrenal axis activity (Weber et al., 2022).

Direction of stress–health behavior associations

This section presents the results for research question (3), focusing on the direction and magnitude of the stress–health behaviour associations. In total, we extracted information on 387 analyses examining the stress–health behaviour relationship. For three analyses, information on either significance or effect size was unavailable (e.g., due to the use of machine learning models that did not report standard estimates). Therefore, the following results are based on the 384 analyses for which complete information was available.

Across the included analyses, 30.2% ($n = 116$) found stress to relate to unhealthier behaviour, 14.1% ($n = 54$) to healthier behaviour, and 55.7% ($n = 214$) found no relationship between stress and health behaviour. The rate ratios ranged from 0.71 to 2.77 ($Md = 1.01$, $IQR = 0.91$–1.08), odds ratios ranged from 0.13 to 4.53 ($Md = 1.14$, $IQR = 1.01$–1.41), and standardised beta coefficients ranged from –0.94 to 0.79 ($Md = 0.03$, $IQR = -0.04$ to 0.13).

As can be seen in Figure 2, the stress-health behaviour association varied between the different health behaviours. This was confirmed by a chi-square test, which revealed significant differences in the results on the stress-health behaviour relationship (positive, negative or not significant) by health behaviours (X^2 [6, $N = 384$] = 47.80, p <.001). Whereas analyses on stress and eating behaviour or smoking showed predominantly no relations or relations to unhealthy behaviour (i.e., more unhealthy eating or smoking with greater stress), the opposite was found for physical activity (i.e.,

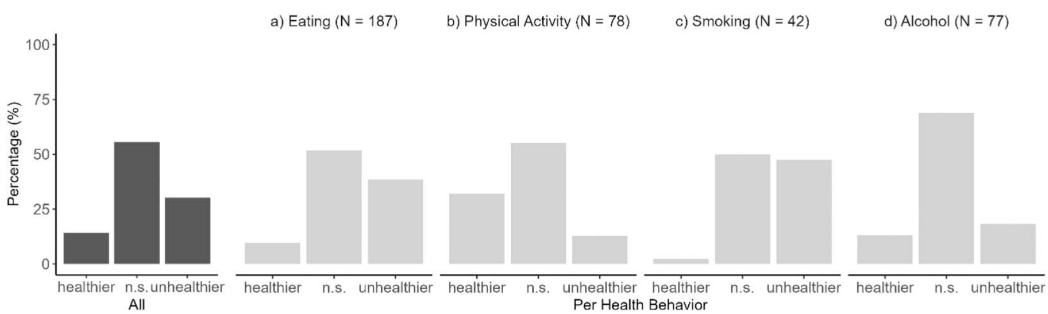

Figure 2. Direction and significance of the associations between stress-health behaviour relationships by type of health behaviour.

Note: Healthier means that stress related to healthier behaviour, unhealthier is stress relating to unhealthier behaviour, n.s. = non-significant stress-health behaviour association; total number of analyses in all is 384.

more physical activity with greater stress). For alcohol consumption the predominant finding was a non-significant relationship.

Variability of stress health behavior associations

This section presents the results for research question four, about the variability of the associations. The variability in the stress - health behaviour associations will be presented according to sample characteristics, conceptual characteristics, methodological characteristics, and moderators that authors used in their analyses.

The variability in the direction of stress – health behaviour associations in the analyses by sample characteristics can be seen in Figure 3 (health status of sample in Panel A and body mass index (BMI) in Panel B). A chi-square test of independence revealed significant differences in the distribution of results regarding the stress-health behaviour relationship by health status (X^2 [10, N = 384] = 27.33, p = <.001). In samples specified by authors as healthy, stress related to more unhealthy behaviour while in samples with physical illness stress related to more healthy behaviour. In mixed samples or samples with psychological disorders results were more balanced. Given that the relevance of BMI in the relationship between stress and health behaviour may vary across behavioural domains (e.g., it may be less relevant for alcohol use), we limited this analysis to eating behaviour and physical activity, where a stronger theoretical and empirical link with BMI has been established. A chi-square test of independence revealed a significant association between BMI and the

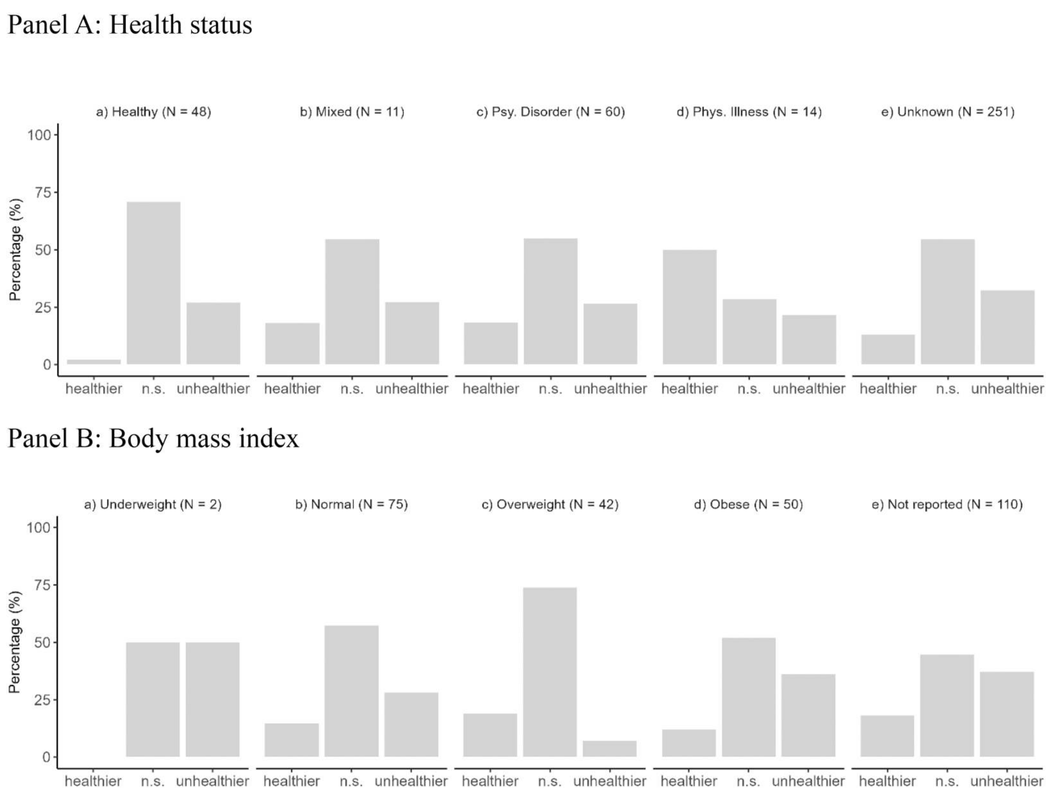

Figure 3. Variability in direction and significance of associations between stress and health behaviour by sample characteristics.

Note: healthier means stress relating to healthier behaviour, unhealthier means stress relating to unhealthier behaviour, n.s. = non-significant; psy. disorder = psychological disorder, phys. illness = physical illness; underweight = body mass index < 18.5, normal = body mass index ≥ 18.5 ≤ and < 25, overweight = body mass index ≥ 25 ≤ and < 30, obese = body mass index ≥ 30; the body mass index panel only includes results for eating behaviour and physical activity.

distribution of significant associations for eating behaviour and physical activity (X^2 [8, $N = 279$] = 16.73, $p = .033$). In obese samples, stress was associated with more unhealthy behaviour compared to normal-weight and overweight samples.

Differences in the direction of stress – health behaviour associations in the analyses by conceptual and methodological characteristics can be seen in Figure 4 (Panel A: stress aspect investigated; Panel B: stress measure used; Panel C: concurrent versus lagged analysis by level of analysis; Panel D: centreing of predictor). Chi-square test of independence revealed a significant association between stress aspect investigated and distribution of significant relationships (X^2 [6, $N = 384$] = 27.32, $p <$ .001). Analyses examining the stressors and health behaviour showed a balance between non-significant associations and those relating to unhealthier behaviour. Greater stress experienced related more to unhealthier behaviour while greater physiological stress was more frequently associated with healthier behaviour. However, overall, stress experience and physiological stress predominantly showed no association with health behaviour. When a combination between the stressor and stressor experience aspect was investigated, results looked similar to investigating the stressor aspect.

For the specific stress measures used, chi-square test of independence revealed a significant association between stress measures used and health behaviour (X^2 [8, $N = 384$] = 30.68, $p =$ <.001). While for physiological stress measures, greater stress related to healthier behaviour, self-report measures showed that greater stress related to unhealthier behaviour. Except for stressful events questionnaires with an open answer format, where more events were most often linked to unhealthier behaviour, stress measures predominantly showed no significant relationship with health behaviour.

Further, chi-square test of independence revealed a significant association between lagged versus concurrent analyses, (X^2 [2, $N = 384$] = 6.38, $p = .041$). Both, concurrent and lagged analyses of stress and health behaviour predominantly showed no relationship, but significant associations showing that greater stress related to unhealthier behaviour were more frequently observed in concurrent analyses. Further, chi-square tests of independence revealed no differences in stress-health behaviour relationships depending on centreing of stress predictors (X^2 [8, $N = 384$] = 13.09, $p = .109$).

Moderators of the stress – health behavior relationship

Individual records tested and reported a range of different moderators in the stress – health behaviour relationship (see S7, Table SXI in the supplementary material). Most moderators were stable, interindividual factors relating to personality (e.g., trait mindfulness, conscientiousness, sensation seeking), stress (e.g., average severity of hassles, fMRI responses to stress), health behaviour (e.g., restrained eating, habit strength, alcohol dependence, family history of behaviour), sociodemographic (e.g., sex/gender, education, family cohesion, income), or clinical variables (e.g., high versus low depression symptoms). Some records also investigated time-varying moderators including study or time-related factors (e.g., time between stress and health behaviour assessment), social factors (e.g., social support) or psychological factors (e.g., coping styles).

Notably, personality traits (e.g., trait mindfulness, conscientiousness), biological stress responses (e.g., cortisol; specific activations observed by functional magnetic resonance imaging, fMRI), and sociodemographic factors (e.g., sex, education) were among the most consistently significant moderators of the stress-health behaviour relationship. Time-varying moderators (e.g., coping style, timing of assessment) also emerged as significant in some studies.

Covariates controlled for in analyses of stress and health behavior associations

This section covers the results for research question (5), about which covariates were controlled for. In 72.9% ($n = 280$) of the analyses investigating the stress – health behaviour association, at least one covariate was controlled for. 27.3% ($n = 105$) of models controlled for stable covariates assessed at baseline (e.g., age), 12.8% ($n = 49$) controlled for time-varying factors assessed during intensive

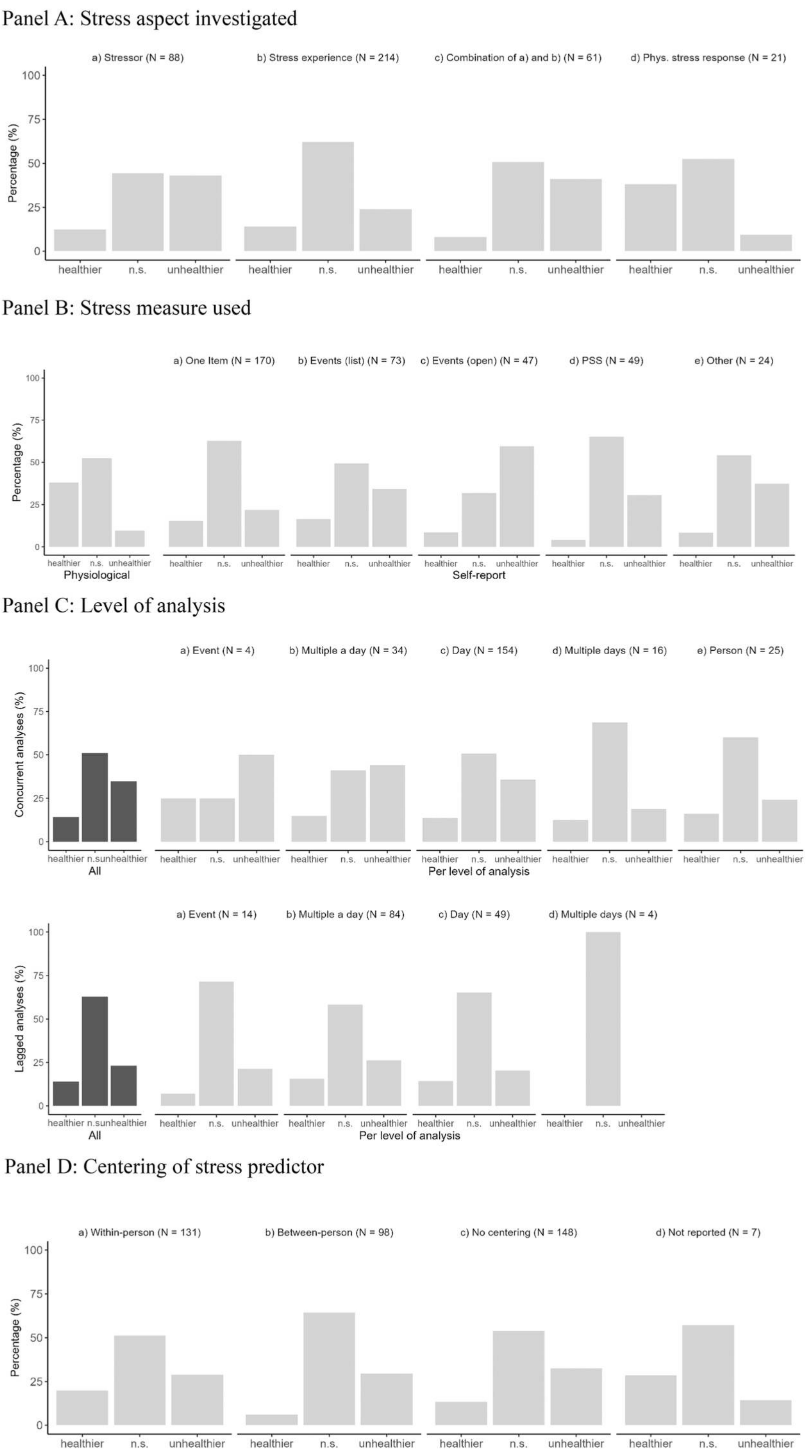

Figure 4. Variability in direction and significance of associations between stress and health behaviour by conceptual and methodological characteristics.

Note: Phys = physiological, healthier means stress relating to more healthier, unhealthier means stress relating to unhealthier behaviour, n.s. = non-significant; example measures of stress aspect such as stressor (e.g., 'Did stressful events occur in the past 2 h?'), stress experience (e.g., 'How stressed do you feel right now'), and physiological stress response (e.g., salivary cortisol measure, HRV measure); level of analysis refers to the temporal resolution of the stress – health behaviour relationship that was analyzed (e.g., multiple a day meaning the association between stress and health behaviour got analyzed multiple times a day).

longitudinal assessment (e.g., craving), 28.4% ($n = 109$) controlled for a mix of both, and 2.1% ($n = 8$) controlled for variables they calculated themselves (e.g., time between assessments). In 24.2% ($n = 93$) of models authors did not give a reason for why they included said covariates, in 30.2% ($n = 116$) authors gave an empirical rationale, in 2.6% ($n = 10$) authors gave a theoretical rationale, and in 12.0% ($n = 46$) authors gave some other arguments. Find a list of the covariates that were controlled for in each model in S7, Table SXI in the supplementary material.

Stable covariates that were added to the models included (1) study-related covariates (intervention or control group, targeted calory intake), (2) personality (trait anxiety, stress eating trait, conscientiousness, average level of negative affect), (3) demographic variables (sex/gender, ethnicity, income, education level, car ownership), (4) clinical variables (presence of mood or anxiety disorder, chronic health conditions, body mass index, menstrual cycle group), (5) behavioural variables (habit strength, health behaviour at baseline), and neuropsychological variables (fMRI response in laboratory).

Time-varying covariates that were added to models included (1) time variables (day of the week, work shift in the morning/evening/night, time of day), (2) psychological states (positive and negative affect, boredom, anger/irritation, feeling deprived, loneliness, frustration, feeling left-out), (3) behavioural variables (physical activity, sleep), (4) contextual variables (presence of accompanying person, place, work-shift intensity, social support, availability of delicious food, hungry, time pressure), (5) coping variables (coping strategies, self-compassion), (6) autoregressive effects (stress or health behaviour measure at last timepoint), and (7) study-related variables (number of completed surveys per day).

Discussion

This systematic review examined how the relationship between stress and key health behaviours (eating behaviour, physical activity, smoking, and alcohol consumption) is investigated in daily life. It synthesises the stress measures used, their reliability, the magnitude and variability of associations, and the covariates considered. Most studies used self-report measures of stress, primarily assessing the stress experience. Self-report measures of stress were mostly single items, often self-generated, while multi-item questionnaires were less common. Physiological stress measures were used in very few studies, often including multiple indicators (e.g., HRV, HR). Reliability of stress measures was rarely reported, nor was missing data. Overall, the associations between stress and health behaviours were small and inconsistent, with the majority of analyses showing no significant relationship. The wide range of effect sizes, particularly in the standardised beta coefficients, highlighted substantial variability across studies. The stress-health behaviour relationship varied by health status, with stress linked to unhealthy behaviours in healthy samples but healthier behaviours in samples with physical illness, and BMI, with stress relating to more unhealthy behaviour (physical activity and eating behaviour) in individuals with obesity compared to those with normal weight or overweight. The stress-health behaviour relationship further varied by stress aspect, with the stress experience relating to unhealthier and physiological stress to healthier behaviour, and stressful event questionnaires with open format more often relating to unhealthier behaviour compared to other self-report measures. Further, significant effects were more common in concurrent compared to lagged analyses, while centreing approaches (e.g., distinguishing within- or between-person differences) did not differ. Moderators of the stress-health behaviour relationship that were found to be significant by the included records suggest that both stable personal characteristics (e.g., personality, stress reactivity) and time-varying factors (e.g., coping, timing of assessment) can help explain the variability of stress-health behaviour relationships. Most analyses controlled for covariates, including stable, time-varying, or mixed factors, though reasons for inclusion were often not stated or lacked theoretical rationale.

Stress aspects and measures investigated

While physiological measures focused exclusively on the physiological stress response, the stress aspect measured with self-reports varied. Self-report measures were used to assess stressors, the stress experience and combinations thereof, also sometimes including related concepts such as stress-related coping (see Figure 5 for an overview of how the stress aspects were measured in relation to the stress process).

Both the stressor (e.g., through quantifying stressful events) and stress experience aspects (e.g., through individuals reflecting on the subjective level of stressfulness) can be assessed well through self-report questionnaires (O'Connor & Ferguson, 2016; Ursin & Eriksen, 2004). When assessing the stressor aspect, this was often done based on frequency (number of stressors) or their categorisation into types (e.g., interpersonal vs. academic stressors). In the included studies this was done via stressful events questionnaires (checklists or open format) or single items. While checklists of stressful events such as the daily stress inventory allow a seemingly more objective quantification and interindividual comparison of stressors that occurred, subjective appraisal and thus personal relevance of these stressors might be missing. Some studies included a stressfulness rating of the events, but this blending of stressor and stress experience makes it hard to distinguish whether observed effects are due to the occurrence of stressors themselves or the subjective appraisal of their stressfulness. On the other hand, open-format assessment of occurred stressors provides ecological validity by letting participants list personally relevant stressors they experienced. However, this introduces recall biases and the variability in what participants consider 'stressful' may reduce reliability for research questions on the interindividual level. Lastly, single-items (e.g., 'Did a stressful event occur?') provide a brief but unnuanced assessment of experienced stressors. Unlike stressful event questionnaires, they do not allow categorisation into stressor types. However, they offer a more concise alternative to extensive checklists (e.g., with 56 items), minimising participant burden. During the screening process, records assessing the stressor aspect were more frequently excluded compared to those assessing the stress experience due to the inclusion criterion requiring cognitive appraisal. Many of these excluded studies used checklists of potentially stressful events without assessing participants' subjective evaluation or limited responses to whether the events occurred, not whether they were experienced as stressful.

For the stress experience aspect, mostly the PSS (Cohen et al., 1983) and single-item measures (e.g., 'How stressed do you feel right now?'; Chen-Sankey et al., 2019) were used. In the PSS, especially the subscale on perceived helplessness with items such as 'In the last month, how often have you been upset because of something that happened unexpectedly?' or 'In the last

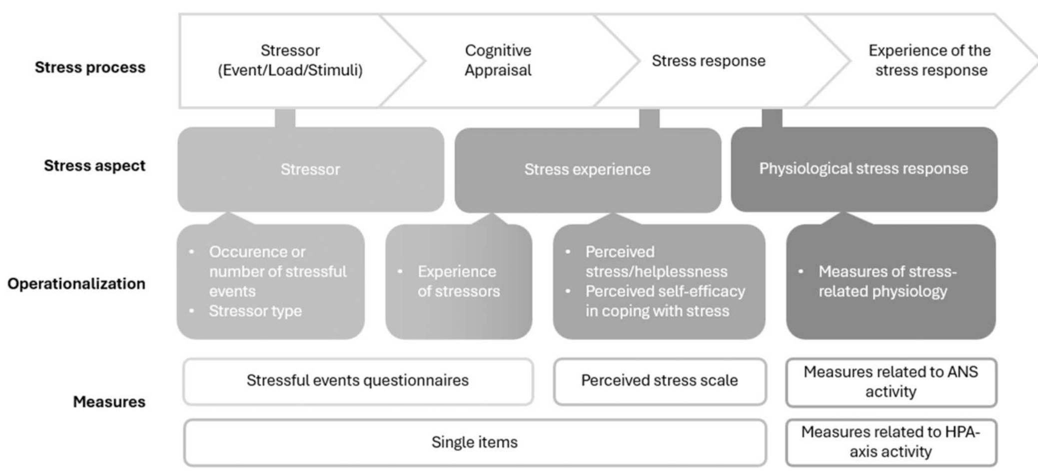

Figure 5. Stress aspects and how they were measured in the reviewed studies.

Note: Stress aspects (Schlotz, 2019; Ursin & Eriksen, 2004) with their operationalisation (grey), how they relate to the stress process (arrows; including cognitive appraisal; Lazarus & Folkman, 1984) and how they were measured in included records in this systematic review (bottom). ANS = autonomic nervous system, HPA = hypothalamic–pituitary–adrenal.

month, how often have you felt nervous and 'stressed'?' closely relate to assessing the subjective level of stressfulness of the stress experience aspect (Harris et al., 2023; Ursin & Eriksen, 2004). On the other hand, the subscale on perceived self-efficacy with items such as 'In the last month, how often have you felt confident in your ability to handle your personal problems?' and 'In the last month, how often have you felt that you were on top of things?' even when recoded as is intended in the PSS might assess something qualitatively different from the level of stressfulness (e.g., ability to cope with stress). While both stress experience and perceived self-efficacy in coping with stress might be relevant for health behaviour, content validity could be reduced when conflating stress experience with coping ability, making it unclear if it is the stress experience relating to health behaviour or someone's perceived self-efficacy, which might be closely related to perceived self-efficacy in engaging in healthy behaviour. Further, the PSS by measuring subjective feelings of unpredictability and overload might reflect more broader, generalised, chronic and stable interindividual characteristic of stress perception (Harris et al., 2023) compared to concrete, behaviorally-relevant fluctuations in the stress experience. Even when adapted to a daily life context and shorter time periods, the PSS was originally developed and validated for assessment of global, more chronic stress (Cohen et al., 1983). In comparison, single-item measures (e.g., 'How stressed do you feel right now?') could be more useful for assessing these acute variations in stress experiences in daily life.

Lastly, the physiological stress response was only investigated by very few studies included in this review. From previous research we know that the physiological stress response in daily life can be measured through autonomic nervous system activity with indicators such as blood pressure, HR, HRV, ambulatory blood pressure, electrodermal activity, and salivary alpha-amylase (Weber et al., 2022). Of these measures, in the studies included in this review only HR (e.g., Ranzenhofer et al., 2022) and HRV (e.g., Cook et al., 2022) have been investigated in relation to health behaviour. To measure hypothalamic–pituitary–adrenal axis activity, the common measures in everyday life contexts include current salivary cortisol levels, the cortisol awakening response, diurnal cortisol slope, single daytime cortisol levels, and the area under the curve of salivary cortisol across the day (Weber et al., 2022). Of these measures, only the cortisol awakening response (e.g., Naya et al., 2021) was investigated in relation to health behaviour by studies included in this review. One study additionally investigated mean cortisol levels over the day in relation to health behaviour (Moss et al., 2021). Thus, in this review we were only able to investigate the relationship between a few of the possible physiological stress measures to health behaviour in daily life. Although these indicators are well-established in psychophysiological research and are commonly used to index physiological stress responses in everyday life, their validity and reliability can vary significantly depending on the device and context of use. For example, measures of HR and HRV at the wrist through sensors such as fitbit or garmin using photoplethysmographic signals can be easily disturbed through movement artefacts in daily life settings (e.g., because of physical activity, changes in posture; Quigley et al., 2019). Similarly, while salivary cortisol is a well-established measure, valid interpretation requires precise sampling timing and adherence to protocols, which are less standardised in daily life compared to laboratory settings (Stoffel et al., 2021). Lastly, the inclusion of measures of the physiological stress response also requires handling saliva samples (e.g., carrying tubes, storage in fridge; Stoffel et al., 2021) or charging of sensors to measure HR and HRV which can be burdensome to participants.

While our systematic review captures a range of operationalizations and measures in regards to the stress aspects as defined by the framework of Ursin and Eriksen (2004), it is important to note that only stress conceptualizations present in the included records could be reviewed. For instance, although several studies assessed the occurrence or number of stressful events, none examined cumulative stressor frequency over time (e.g., stressor pile-up), which may be a relevant but underexplored dimension in daily life research. Further, the experience of the stress response as a stress aspect was a priori excluded from this systematic review due to the exclusion criteria of measures focusing on general mood states or negative affect rather than perceived stress. This highlights the need for future studies to investigate more complex temporal patterns of stress exposure and their implications for health behaviour.

Relationship of stress and health behavior in daily life

Understanding the complexity of the relationship between stress and health behaviour could be affected by the way stress was measured (i.e., stress aspect and specific questionnaire used). This association is further complicated due to different health behaviours often being studied using distinct methods (e.g., more frequent single-item and event-based assessment of stress in studies investigating smoking behaviour). Thus, making it difficult to separate the effects of stress measurement from the choice of health behaviours examined.

The findings of this review confirm the complexity of the stress-health behaviour relationship, and that it depends on many factors. In terms of the stress aspect, the results suggest that greater physiological stress is more consistently associated with healthier behaviours (e.g., less smoking, more physical activity), whereas greater self-reported stress, especially stressors reported in an open format, tends to relate more strongly with unhealthier behaviours (e.g., more smoking, less physical activity). One reason for the diverging findings between self-reported and physiological stress measures in relation to health behaviour may be the broader, less specific nature of physiological stress measures. Unlike self-reported stress, which captures an individual's subjective experience of stress, physiological stress measures reflect activity in the autonomic nervous system and the hypothalamic–pituitary–adrenal axis, which are systems that are activated during stress but also respond to other physiological and emotional states (e.g., Laborde et al., 2017). As a result, these measures may not always correspond with an individual's conscious perception of stress, particularly in cases of low emotional awareness or chronic stress habituation (Brosschot et al., 2018). Empirical research has shown that concordance between self-reported and physiological stress is often low to moderate, and can vary by context, timescale, and individual characteristics (e.g., Campbell & Ehlert, 2012; Weber et al., 2022). This supports the notion that self-reported and physiological stress measures represent different stress aspects (Ursin & Eriksen, 2004). For example, self-reported stress may better predict affect-driven behaviours like emotional eating, while physiological indicators (e.g., heart rate variability) may be more sensitive to acute arousal affecting immediate behavioural regulation, such as physical activity. Further, a systematic review of intensive longitudinal studies has shown that even when using high-frequency sampling and concurrent measurement of stressors and physiological stress response, typical acute stress responses are only partially detectable in daily life, possibly due to the mild nature of everyday stressors, individual differences in stress appraisals, and the complexity of uncontrolled real-world environments (Weber et al., 2022). Repeatedly reporting one's stress in intensive longitudinal studies may influence perceived stress through assessment reactivity (Michie et al., 2013), particularly due to an initial elevation bias for internal states like stress (Shrout et al., 2018), potentially increasing divergence from physiological indicators less affected by self-monitoring. These reactivity effects, along with temporal influences such as day trends, fatigue, or habituation, underscore the importance of accounting for time-related factors in repeated measures designs, as they can confound within-person associations if not properly modelled.

Another reason for the variable associations between stress and health behaviour could relate to the temporal resolution investigated. Physiological stress responses, particularly when acute, are closely linked to adaptive survival mechanisms such as fight-or-flight, first described by Cannon (e.g., 1914, 1929). In response to an immediate stressor, the body releases corticotropin-releasing hormone and noradrenaline, which facilitate energy mobilisation for rapid action and movement (e.g., physical activity) and suppress appetite (Sominsky & Spencer, 2014; Torres & Nowson, 2007). Thus, heightened physiological arousal could promote increased physical activity and lower food intake as part of an evolutionary response to escape or confront a threat, potentially reflecting an adaptive coping mechanism. For example, Cook et al. (2022) and Moss et al. (2021), included in this review, found that more physiological stress related to increased physical activity and healthier eating. In contrast, perceived stress, particularly the experience of frequent stressors, tends to be associated with unhealthier behaviours (e.g., increased consumption of energy-dense foods; Adam & Epel, 2007) which we also found in our review (e.g., increased snacking, Conner et al., 1999; less physical activity and more sedentary behaviour, Zenk et al., 2014; higher cigarette consumption, O'Connor et al., 2009).

Further, also for the specific self-report measures used there was variability in the association to health behaviours with stressful events questionnaires in an open format showing the most frequent associations to unhealthy behaviour. One potential explanation for why these were most often associated with unhealthier behaviour is that they capture frequent, specific, and cumulative stressors occurring in everyday life. It might be this cumulative pattern of repeated stressors and the experience thereof that are associated with unhealthy behaviour. Repeated reactivity to and recovery from stressors, a phenomenon often described as pileup (e.g., Almeida et al., 2020; Smyth et al., 2018), compared to the stress experience has been shown more relevant for subsequent health behaviour in previous studies (e.g., for physical activity; Almeida et al., 2020). Unlike acute stress, which triggers energy mobilisation, frequent stressors might contribute to the learned association between stress and unhealthy behaviours, particularly through repeated engagement in reward-driven behaviour as a coping mechanism (e.g., unhealthy eating, Adam & Epel, 2007; smoking, Minami et al., 2018). Over time, individuals may learn that engaging in unhealthy behaviours temporarily relieves stress by activating the brain's dopaminergic reward system, with repeated use potentially sensitising the reward system to stress-related cues (e.g., Adam & Epel, 2007). This suggests that while acute physiological stress may momentarily support healthier behaviours through biological activation, the cumulative experience of stressors might drive unhealthier behaviour.

Temporal resolution of stress

Concurrent and lagged analyses of stress and health behaviour predominantly showed no relationship, but significant associations were more frequently observed in concurrent analyses. Furthermore, in the lagged analyses, more significant associations were observed in shorter time lags (e.g., multiple times per day as level of analysis; Park et al., 2004) compared to longer ones (e.g., daily level of analysis; Mereish et al., 2018). This pattern suggests that the effects of stress on health behaviour may be short-lived and fleeting, with immediate influences that dissipate over time. This aligns with the idea that stress-driven behaviours, such as emotional eating or alcohol consumption may serve as immediate coping mechanisms rather than leading to sustained behavioural changes (e.g., Adam & Epel, 2007). Additionally, the stronger associations in concurrent analyses could partially be due to the bidirectional relationship between stress and health behaviour. Stress can influence behaviour, but behaviours can also impact stress, creating a feedback loop (e.g., Nguyen-Michel et al., 2006; Schultchen et al., 2019). For instance, to cope with stress, a person might reach for a cigarette or engage in unhealthy snacking for potential relief from the effects of the stressful experience (e.g., Adam & Epel, 2007; Kassel et al., 2003). This can temporarily create a feeling of relaxation and stress relief, but through physiological (e.g., dropping of nicotine levels in the body, Cambron et al., 2019) and psychological pathways (e.g., feelings of guilt or regret for behaviour inconsistent with goals; Sorys & Byrka, 2021), stress levels may rise again. Retrospective bias may also play a role as individuals recall stress and behaviours in ways that fit their expectations rather than actual experiences, potentially attributing behaviour to stress after the fact (e.g., 'I only drank so much alcohol because I had a stressful day').

Improving the science of stress and health behavior in daily life

To advance our understanding of how stress impacts health behaviours in daily life, future research must address several critical methodological and theoretical gaps identified in this review.

Use of reliable and valid stress measures

The validity and reliability of stress measures are essential for advancing research on stress and health behaviour in daily life. Many records in this review did not report on these psychometric properties, and those that did often relied on correlations with other measures or Cronbach's alpha (Cronbach, 1951), which does not adequately capture within-person reliability. More appropriate approaches include calculating Omega reliability to estimate within- and between-person reliability (Geldhof et al., 2014), using multilevel models to treat items as an additional level (Nezlek, 2017), or fitting individual-level confirmatory factor models to time series data (Hu et al., 2016). Measurement error vector autoregressive (ME-VAR) models also offer a way to separate trait and state reliability (Schuurman & Hamaker, 2019). Further, correlational validity has faced growing criticism for being insufficient, particularly in complex daily life contexts, highlighting the need to address the theoretical foundations and causal mechanisms underlying a measure to determine whether it truly captures the intended construct (Bringmann & Eronen, 2016). Lastly, while adaptation of measures to the daily life context and the specific study are important, both reliability and validity should be investigated for such adaptations (e.g., to a daily or momentary level) as well, which was rarely done in the investigated records.

Specify stress aspect and align measurement

Given the multidimensional nature of stress (e.g., Ursin & Eriksen, 2004), it is crucial to clearly define the stress aspect studied, distinguish it from related constructs (e.g., perceived coping ability), and align the measurement method with the hypothesised mechanism. Researchers should select stress aspects and corresponding measures based on how stress is expected to influence the health behaviour of interest. For example, if stress is hypothesised to suppress appetite via hormonal pathways (e.g., cortisol interacting with ghrelin; Kuckuck et al., 2023), a physiological marker like cortisol would be appropriate. If stress is thought to impair self-regulation (Smith & DeCoster, 2000), a perceived stress or heart rate variability (HRV) measure, linked to self-regulation (Laborde et al., 2018), would be more suitable. The relevance of each mechanism may also depend on the specific behaviour studied.

Furthermore, combining self-report and physiological indicators can strengthen validity through convergence across methods (Bringmann & Eronen, 2016). Given current research gaps, a systematic approach coult help to examine which stress measures, mechanisms, and timescales are most relevant for different behaviours (e.g., through multiverse studies; Langener et al., 2024). Lastly, we acknowledge that in intensive longitudinal studies there are potential barriers that researchers (e.g., cost of devices) and study participants (e.g., technological fluency required), which need to be taken into account when choosing stress measures.

Rationale for sampling timing and frequency

Our results showed that the timing and frequency of intensive longitudinal sampling are often inadequately justified in existing studies. This lack of rationale poses challenges for interpreting results and integrating findings across studies. Future research should be grounded in theoretical models that specify how stress and health behaviours fluctuate over time and on what timescales these processes unfold.

Acute stress responses may require high-frequency or momentary assessments, while longer-term effects may be better captured through aggregated daily or weekly measures. Sampling decisions should consider the expected latency between stress and behaviour, underlying mechanisms, and behavioural frequency. Time-lagged designs are particularly valuable for delayed responses (e.g., evening stress-related eating) and offer a step toward causal inference through temporal sequencing, especially when experimental designs are not feasible. In contrast, concurrent assessments may miss transient dynamics, such as when stress influences behaviour through short-lived affective states. Additionally, our findings suggest that more frequent assessments (e.g., event-based, multiple times per day) are more likely to detect meaningful stress fluctuations that relate to behaviour. This has implications for daily life studies aiming to intervene in the stress–health behaviour relationship, such as just-in-time adaptive interventions (JITAIs; Nahum-Shani et al., 2018). It further highlights the need to match the sampling frequency to the expected timing of stress-related changes in behaviour, and to report how often and in what form meaningful changes in stress occur (Chevance et al., 2021). Further, missing data is a critical consideration for sampling timing and frequency. The median missing rate was 12.0%, with wide variability due to technical failures (e.g., sensor errors) and participant burden (e.g., frequent prompts). While higher sampling frequency improves temporal precision, it might also increases non-compliance, especially under high stress.

Together, these considerations can support better study design by aligning sampling with the temporal dynamics of stress and behaviour. Researchers should model stress-behaviour links across different timeframes, accounting for factors such as recovery, cumulative exposure (e.g., stress pileup), and behavioural decision points (e.g., lunch choices). Phenomenological studies could inform theory by identifying how different stress aspects fluctuate in daily life (Borsboom et al., 2021). Transparent reporting of sampling rationale and timing will enhance comparability and advance the field's ability to draw robust conclusions about stress–health behaviour relationships.

Use of reporting guidelines to improve study quality

Study quality in the included records was generally low, as assessed with the EPHPP tool, for two main reasons. First, although the EPHPP is widely used in health research, it was developed for conventional designs and does not adequately capture the unique features of intensive longitudinal studies (e.g., prompt timing rationale, device adherence, within-person reliability). This highlights the need for a risk of bias tool tailored to this design, potentially based on elements from existing reporting guidelines for intensive longitudinal research (see Supplementary Material S2). Second, many studies lacked essential information, especially regarding reliability and validity, making it difficult to evaluate quality. This underscores the importance of adopting standardised reporting guidelines to improve transparency and consistency (see Supplementary Material S2) and can serve as valuable frameworks to enhance reporting completeness.

The lack of standardisation and reporting also limited our ability to synthesise findings across studies, particularly regarding sampling strategies and sociodemographic characteristics. For example, socioeconomic status and related factors (e.g., education, income) may moderate the stress–health behaviour relationship, as individuals with lower socioeconomic status often experience more chronic stress and fewer health-promoting resources, contributing to behaviours like unhealthy eating and inactivity (Kraft & Kraft, 2021). Without consistent reporting, such disparities remain difficult to assess. One way to improve this is by using standardised tools for sociodemographic reporting, such as the Diversity Minimal Item Set (DiMIS; Stadler et al., 2023), to enable better comparisons across samples and clarify the role of social determinants.

Limitation of this review

Only studies published in English were included in this review, which may have resulted in the exclusion of relevant research conducted in other languages. This language restriction could introduce bias by overrepresenting studies from English-speaking contexts and underrepresenting findings from other cultural and linguistic backgrounds. Additionally, although many records reporting non-significant results were included, the effect may still be overestimated due to the exclusion of grey literature, such as unpublished dissertations, reports, and conference proceedings.

The heterogeneity in study designs, measures, and methodologies across the included studies limited the feasibility of conducting a quantitative meta-analysis. Variability in factors such as sampling strategies and operational definitions of stress and health behaviours introduced complexity that precluded statistical synthesis of results. As a result, the conclusions drawn from this review are qualitative in nature and may lack the precision offered by meta-analytic approaches.

To maintain a clear focus on stress, this review excluded measures of related but distinct constructs, such as anxiety and negative affect. While this approach ensures conceptual clarity, it also meant that we did not capture the experience of the stress response (e.g., affective reactivity), which is also considered a stress aspect (e.g., Ursin & Eriksen, 2004) and has been studied in intensive longitudinal studies as well (e.g., Almeida et al., 2020). In addition, we set a 30-day cut-off to define short-term stress measures, aiming to exclude chronic assessments. Although somewhat arbitrary due to the lack of consensus on when stress becomes chronic, this threshold was only met by one included study (Cadigan et al., 2021). Future research could explore how different conceptualizations of stress, including physiological responses, contribute to the stress-health behaviour relationship, and work toward clearer definitional boundaries between acute and chronic stress in the context of intensive longitudinal research.

Conclusion

This review highlights the many different measures used to investigate the relationship between stress and health behaviours in daily life. This diversity is shaped by methodological variability and a predominant reliance on self-report measures, which may influence the consistency and comparability of findings. Simply asking whether stress relates to health behaviour is insufficient; it is essential to consider which stress aspect is being assessed, and how, and when the relationship occurs. To advance the field, future research should be clear which stress measures they used for which aspect of stress, systematically investigate the reliability and validity of tools, and better justify assessment timing and frequency. Addressing these gaps, alongside reducing participant burden and improving standardised reporting, will enable more robust conclusions and the development of effective ecological momentary interventions. While observational studies have provided valuable insights in daily life, experimental studies in everyday contexts are necessary to establish causal pathways between stress and health behaviour (e.g., through online adaptations of the Trier Social Stress Test to induce stress; Kirschbaum et al., 1993; such as Gunnar et al., 2021; or stress-reduction paradigms e.g., slow-paced breathing; Laborde et al., 2022). These steps are essential for capturing the nuanced interplay between stress and health behaviours, ultimately informing targeted interventions to promote health in everyday contexts.

Acknowledgement

Special thanks to Alyssa Hadorn and Lea Burch for supporting the screening process and Monika Beutler for helping us create the search string for this review.

Disclosure statement

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

Funding

This work was supported by the Schweizerischer Nationalfonds zur Förderung der Wissenschaftlichen Forschung (Swiss National Science Foundation) under Grant (number 214658).

References

Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology & Behavior*, *91*(4), 449–458. https://doi.org/10.1016/j.physbeh.2007.04.011

Algren, M. H., Ekholm, O., Nielsen, L., Ersbøll, A. K., Bak, C. K., & Andersen, P. T. (2018). Associations between perceived stress, socioeconomic status, and health-risk behaviour in deprived neighbourhoods in Denmark: A cross-sectional study. *BMC Public Health*, *18*(1), 1–12. https://doi.org/10.1186/s12889-018-5170-x

Almeida, D. M., Marcusson-Clavertz, D., Conroy, D. E., Kim, J., Zawadzki, M. J., Sliwinski, M. J., & Smyth, J. M. (2020). Everyday stress components and physical activity: Examining reactivity, recovery and pileup. *Journal of Behavioral Medicine*, *43*(1), 108–120. https://doi.org/10.1007/s10865-019-00062-z

Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The Daily Inventory of Stressful Events: An interview-based approach for measuring daily stressors. *Assessment*, *9*(1), 41–55. https://doi.org/10.1177/1073191102009001006

Armeli, S., Carney, M. A., Tennen, H., Affleck, G., & O'Neil, T. P. (2000). Stress and alcohol use: A daily process examination of the stressor–vulnerability model. *Journal of Personality and Social Psychology*, *78*(5), 979–994. https://doi.org/10.1037/0022-3514.78.5.979

Aronson, K. R., Almeida, D. M., Stawski, R. S., Klein, L. C., & Kozlowski, L. T. (2008). Smoking is associated with worse mood on stressful days: Results from a national diary study. *Annals of Behavioral Medicine*, *36*(3), 259–269. https://doi.org/10.1007/s12160-008-9068-1

Atkins, D. C., Baldwin, S. A., Zheng, C., Gallop, R. J., & Neighbors, C. (2013). A tutorial on count regression and zero-altered count models for longitudinal substance use data. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors*, *27*(1), 166–177. https://doi.org/10.1037/a0029508

Bamert, M., & Inauen, J. (2022). Physiological stress reactivity and recovery: Some laboratory results transfer to daily life. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.943065

Becker, H. C. (2017). Influence of stress associated with chronic alcohol exposure on drinking. *Neuropharmacology*, *122*, 115–126. https://doi.org/10.1016/j.neuropharm.2017.04.028

Beckham, J. C., Wiley, M. T., Miller, S. C., Dennis, M. F., Wilson, S. M., McClernon, F. J., & Calhoun, P. S. (2008). Ad lib smoking in post-traumatic stress disorder: An electronic diary study. *Nicotine & Tobacco Research*, *10*(7), 1149–1157. https://doi.org/10.1080/14622200802123302

Beutel, T. F., Zwerenz, R., & Michal, M. (2018). Psychosocial stress impairs health behavior in patients with mental disorders. *BMC Psychiatry*, *18*(1), 375. https://doi.org/10.1186/s12888-018-1956-8

Bolger, N., & Laurenceau, J. P. (2013). *Intensive longitudinal methods: An introduction to diary and experience sampling research*. Guilford Press.

Borsboom, D., van der Maas, H. L. J., Dalege, J., Kievit, R. A., & Haig, B. D. (2021). Theory construction methodology: A practical framework for building theories in psychology. *Perspectives on Psychological Science*, *16*(4), 756–766. https://doi.org/10.1177/1745691620969647

Bos, F. M., Snippe, E., Bruggeman, R., Wichers, M., & van der Krieke, L. (2019). Insights of patients and clinicians on the promise of the experience sampling method for psychiatric care. *Psychiatric Services*, *70*(11), 983–991. https://doi.org/10.1176/appi.ps.201900050

Braitman, A. L., Romano, K. A., Heron, K. E., Ehlke, S. J., Shappie, A. T., & Lewis, R. J. (2021). Psychometric analysis and validity of the daily sexual minority stressors scale among young adult same-sex female couples. *Psychological Assessment*, *33*(11), 1025–1037. https://doi.org/10.1037/pas0001073

Brantley, P. J., Waggoner, C. D., Jones, G. N., & Rappaport, N. B. (1987). A daily stress inventory: Development, reliability, and validity. *Journal of Behavioral Medicine*, *10*(1), 61–73. https://doi.org/10.1007/BF00845128

Bringmann, L. F., & Eronen, M. I. (2016). Heating up the measurement debate: What psychologists can learn from the history of physics. *Theory & Psychology*, *26*(1), 27–43. https://doi.org/10.1177/0959354315617253

Brosschot, J. F., Verkuil, B., & Thayer, J. F. (2018). Generalized unsafety theory of stress: Unsafe environments and conditions, and the default stress response. *International Journal of Environmental Research and Public Health*, *15*(3), 464. https://doi.org/10.3390/ijerph15030464

Businelle, M. S., Ma, P., Kendzor, D. E., Frank, S. G., Wetter, D. W., & Vidrine, D. J. (2016). Using intensive longitudinal data collected via mobile phone to detect imminent lapse in smokers undergoing a scheduled quit attempt. *Journal of Medical Internet Research*, *18*(10), https://doi.org/10.2196/jmir.6307

Cadigan, J. M., Fleming, C. B., Patrick, M. E., Lewis, M. A., Rhew, I. C., Abdallah, D. A., Fairlie, A. M., Schulenberg, J. E., Larimer, M. E., & Lee, C. M. (2021). Negative evaluation of role transitions is associated with perceived stress and alcohol consequences: Examination of the transitions overload model in young adulthood using two years of monthly data. *Alcoholism: Clinical and Experimental Research*, *45*(8), 1607–1615. https://doi.org/10.1111/acer.14636

Cambron, C., Haslam, A. K., Baucom, B. R. W., Lam, C., Vinci, C., Cinciripini, P., Li, L., & Wetter, D. W. (2019). Momentary precipitants connecting stress and smoking lapse during a quit attempt. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, *38*(12), 1049–1058. https://doi.org/10.1037/hea0000797

Campbell, J., & Ehlert, U. (2012). Acute psychosocial stress: Does the emotional stress response correspond with physiological responses? *Psychoneuroendocrinology*, *37*(8), 1111–1134. https://doi.org/10.1016/j.psyneuen.2011.12.010

Cannon, W. B. (1914). The emergency function of the adrenal medulla in pain and the major emotions. *American Journal of Physiology-Legacy Content*, *33*(2), 356–372. https://doi.org/10.1152/ajplegacy.1914.33.2.356

Cannon, W. B. (1929). Organization for physiological homeostasis. *Physiological Reviews*, *9*(3), 399–431. https://doi.org/10.1152/physrev.1929.9.3.399

Chen-Sankey, J. C., Choi, K., Kirchner, T. R., Feldman, R. H., Butler, J., & Mead, E. L. (2019). Flavored cigar smoking among African American young adult dual users: An ecological momentary assessment. *Drug and Alcohol Dependence*, *196*, 79–85. https://doi.org/10.1016/j.drugalcdep.2018.12.020

Chevance, G., Baretta, D., Heino, M., Perski, O., Olthof, M., Klasnja, P., Hekler, E., & Godino, J. (2021). Characterizing and predicting person-specific, day-to-day, fluctuations in walking behavior. *PLoS One*, *16*(5), https://doi.org/10.1371/journal.pone.0251659

Clancy, F., Prestwich, A., Caperon, L., & O'Connor, D. B. (2016). Perseverative cognition and health behaviors: A systematic review and meta-analysis. *Frontiers in Human Neuroscience*, *10*, 534. https://doi.org/10.3389/fnhum.2016.00534

Clevers, E., Lutin, E., Cornelis, J., & Van Oudenhove, L. (2020). Gastrointestinal symptoms in office workers are predicted by psychological distress and short sleep duration. *Journal of Psychosomatic Research*, *138*, 110230. https://doi.org/10.1016/j.jpsychores.2020.110230

Coffman, D. L., Oliva, I. B., & Forman, E. M. (2021). Does acceptance-based treatment moderate the effect of stress on dietary lapses? *Translational Behavioral Medicine*, *11*(12), 2110–2115. https://doi.org/10.1093/tbm/ibab078

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385–396. https://doi.org/10.2307/2136404

Conner, M., Fitter, M., & Fletcher, W. (1999). Stress and snacking: A diary study of daily hassles and between-meal snacking. *Psychology & Health*, *14*(1), 51–63. https://doi.org/10.1080/08870449908407313

Cook, P., Jankowski, C., Erlandson, K. M., Reeder, B., Starr, W., & Makic, M. B. F. (2022). Low- and high-intensity physical activity among people with HIV: Multilevel modeling analysis using sensor- and survey-based predictors. *JMIR MHealth and UHealth*, *10*(4), https://doi.org/10.2196/33938

Corporation for Digital Scholarship. (2024). *Zotero* (Version Version 6.0.36) [Computer software]. https://www.zotero.org/.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297–334. https://doi.org/10.1007/BF02310555

de Vries, H., Kamphuis, W., van der Schans, C., Sanderman, R., & Oldenhuis, H. (2022). Trends in daily heart rate variability fluctuations are associated with longitudinal changes in stress and somatisation in police officers. *Healthcare*, *10*(1), https://doi.org/10.3390/healthcare10010144

Dhabhar, F. S. (2014). Effects of stress on immune function: The good, the bad, and the beautiful. *Immunologic Research*, *58*(2), 193–210. https://doi.org/10.1007/s12026-014-8517-0

Dhabhar, F. S. (2018). The short-term stress response: Mother nature's mechanism for enhancing protection and performance under conditions of threat, challenge, and opportunity. *Frontiers in Neuroendocrinology*, *49*, 175–192. https://doi.org/10.1016/j.yfrne.2018.03.004

Diaz, K. M., Thanataveerat, A., Parsons, F. E., Yoon, S., Cheung, Y. K., Alcantara, C., Duran, A. T., Ensari, I., Krupka, D. J., Schwartz, J. E., Burg, M. M., & Davidson, K. W. (2018). The influence of daily stress on sedentary behavior: Group and person (N of 1) level results of a 1-year observational study. *Psychosomatic Medicine*, *80*(7), 620–627. https://doi.org/10.1097/PSY.0000000000000610

Doerr, J. M., Fischer, S., Nater, U. M., & Strahler, J. (2017). Influence of stress systems and physical activity on different dimensions of fatigue in female fibromyalgia patients. *Journal of Psychosomatic Research*, *93*, 55–61. https://doi.org/10.1016/j.jpsychores.2016.12.005

Dohle, S., Diel, K., & Hofmann, W. (2018). Executive functions and the self-regulation of eating behavior: A review. *Appetite*, *124*, 4–9. https://doi.org/10.1016/j.appet.2017.05.041

Dunton, G. F., Atienza, A. A., Castro, C. M., & King, A. C. (2009). Using ecological momentary assessment to examine antecedents and correlates of physical activity bouts in adults age 50+ years: A pilot study. *Annals of Behavioral Medicine*, *38*(3), 249–255. https://doi.org/10.1007/s12160-009-9141-4

Dunton, G. F., Dzubur, E., Huh, J., Belcher, B. R., Maher, J. P., O'Connor, S., & Margolin, G. (2017). Daily associations of stress and eating in mother–child dyads. *Health Education & Behavior*, *44*(3), 365–369. https://doi.org/10.1177/1090198116663132

Eisele, G., Vachon, H., Lafit, G., Kuppens, P., Houben, M., Myin-Germeys, I., & Viechtbauer, W. (2022). The effects of sampling frequency and questionnaire length on perceived burden, compliance, and careless responding in experience sampling data in a student population. *Assessment*, *29*(2), 136–151. https://doi.org/10.1177/1073191120957102

Epel, E., Lapidus, R., McEwen, B., & Brownell, K. (2001). Stress may add bite to appetite in women: A laboratory study of stress-induced cortisol and eating behavior. *Psychoneuroendocrinology*, *26*(1), 37–49. https://doi.org/10.1016/S0306-4530(00)00035-4

Finkelstein-Fox, L., Gnall, K. E., & Park, C. L. (2020). Mindfulness moderates daily stress and comfort food snacking linkages: A multilevel examination. *Journal of Behavioral Medicine*, *43*(6), 1062–1068. https://doi.org/10.1007/s10865-020-00164-z

Fischer, S., Breithaupt, L., Wonderlich, J., Westwater, M. L., Crosby, R. D., Engel, S. G., Thompson, J., Lavender, J., & Wonderlich, S. (2017). Impact of the neural correlates of stress and cue reactivity on stress related binge eating in the natural environment. *Journal of Psychiatric Research*, *92*, 15–23. https://doi.org/10.1016/j.jpsychires.2017.03.017

Fowler, N., Mikhail, M. E., Neale, M., Keel, P. K., Katzman, D. K., Sisk, C. L., Burt, S. A., & Klump, K. L. (2023). Between- and within-person effects of stress on emotional eating in women: A longitudinal study over 49 days. *Psychological Medicine*, *53*(11), 5167–5176. https://doi.org/10.1017/S0033291722002185

Franja, S., Wahl, D. R., Elliston, K. G., & Ferguson, S. G. (2021). Comfort eating: An observational study of affect in the hours immediately before, and after, snacking. *British Journal of Health Psychology*, *26*(3), 825–838. https://doi.org/10.1111/bjhp.12505

Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, *19*(1), 72–91. https://doi.org/10.1037/a0032138

Goldstein, S. P., Zhang, F., Thomas, J. G., Butryn, M. L., Herbert, J. D., & Forman, E. M. (2018). Application of machine learning to predict dietary lapses during weight loss. *Journal of Diabetes Science and Technology*, *12*(5), 1045–1052. https://doi.org/10.1177/1932296818775757

Grzywacz, J. G., & Almeida, D. M. (2008). Stress and binge drinking: A daily process examination of stressor pile-up and socioeconomic status in affect regulation. *International Journal of Stress Management*, *15*(4), 364–380. https://doi.org/10.1037/a0013368

Gunnar, M. R., Reid, B. M., Donzella, B., Miller, Z. R., Gardow, S., Tsakonas, N. C., Thomas, K. M., DeJoseph, M., & Bendezú, J. J. (2021). Validation of an online version of the Trier Social Stress Test in a study of adolescents. *Psychoneuroendocrinology*, *125*, 105111. https://doi.org/10.1016/j.psyneuen.2020.105111

Harris, K. M., Gaffey, A. E., Schwartz, J. E., Krantz, D. S., & Burg, M. M. (2023). The perceived stress scale as a measure of stress: Decomposing score variance in longitudinal behavioral medicine studies. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, *57*(10), 846–854. https://doi.org/10.1093/abm/kaad015

Helzer, J. E., Badger, G. J., Searles, J. S., Rose, G. L., & Mongeon, J. A. (2006). Stress and alcohol consumption in heavily drinking men: 2 years of daily data using interactive voice response. *Alcoholism: Clinical and Experimental Research*, *30*(5), 802–811. https://doi.org/10.1111/j.1530-0277.2006.00093.x

Hill, D., Conner, M., Bristow, M., & O'Connor, D. B. (2023). Daily stress and eating behaviors in adolescents and young adults: Investigating the role of cortisol reactivity and eating styles. *Psychoneuroendocrinology*, *153*, 106105. https://doi.org/10.1016/j.psyneuen.2023.106105

Hill, D., Conner, M., Clancy, F., Moss, R., Wilding, S., Bristow, M., & O'Connor, D. B. (2022). Stress and eating behaviours in healthy adults: A systematic review and meta-analysis. *Health Psychology Review*, *16*(2), 280–304. https://doi.org/10.1080/17437199.2021.1923406

Hill, D. C., Moss, R. H., Sykes-Muskett, B., Conner, M., & O'Connor, D. B. (2018). Stress and eating behaviors in children and adolescents: Systematic review and meta-analysis. *Appetite*, *123*, 14–22. https://doi.org/10.1016/j.appet.2017.11.109

Hsu, T., & Raposa, E. B. (2021). Effects of stress on eating behaviours in adolescents: A daily diary investigation. *Psychology & Health*, *36*(2), 236–251. https://doi.org/10.1080/08870446.2020.1766041

Hu, Y., Nesselroade, J. R., Erbacher, M. K., Boker, S. M., Burt, S. A., Keel, P. K., Neale, M. C., Sisk, C. L., & Klump, K. (2016). Test reliability at the individual level. *Structural Equation Modeling: A Multidisciplinary Journal*, *23*(4), 532–543. https://doi.org/10.1080/10705511.2016.1148605

Jackson, N., & Waters, E. (2005). Criteria for the systematic review of health promotion and public health interventions. *Health Promotion International*, *20*(4), 367–374. https://doi.org/10.1093/heapro/dai022

Jones, M., Taylor, A., Liao, Y., Intille, S. S., & Dunton, G. F. (2017). Real-time subjective assessment of psychological stress: Associations with objectively-measured physical activity levels. *Psychology of Sport and Exercise*, *31*, 79–87. https://doi.org/10.1016/j.psychsport.2017.03.013

Karyotaki, E., Cuijpers, P., Albor, Y., Alonso, J., Auerbach, R. P., Bantjes, J., Bruffaerts, R., Ebert, D. D., Hasking, P., Kiekens, G., Lee, S., McLafferty, M., Mak, A., Mortier, P., Sampson, N. A., Stein, D. J., Vilagut, G., & Kessler, R. C. (2020). Sources of stress and their associations with mental disorders among college students: Results of the world health organization world mental health surveys international college student initiative. *Frontiers in Psychology*, *11*, 1759. https://doi.org/10.3389/fpsyg.2020.01759

Kassel, J. D., Stroud, L. R., & Paronis, C. A. (2003). Smoking, stress, and negative affect: Correlation, causation, and context across stages of smoking. *Psychological Bulletin*, *129*(2), 270. https://doi.org/10.1037/0033-2909.129.2.270

Keeney, R. L. (2008). Personal decisions are the leading cause of death. *Operations Research*, *56*(6), 1335–1347. https://doi.org/10.1287/opre.1080.0588

Keller, A., Litzelman, K., Wisk, L. E., Maddox, T., Cheng, E. R., Creswell, P. D., & Witt, W. P. (2012). Does the perception that stress affects health matter? The association with health and mortality. *Health Psychology*, *31(5)*(5), 677–684. https://doi.org/10.1037/a0026743

Khaw, K.-T., Wareham, N., Bingham, S., Welch, A., Luben, R., & Day, N. (2008). Combined impact of health behaviours and mortality in men and women: The EPIC-norfolk prospective population study. *PLOS Medicine*, *5*(1), https://doi.org/10.1371/journal.pmed.0050012

Kirschbaum, C., Pirke, K. M., & Hellhammer, D. (1993). The 'trier social stress test' – a tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology*, *28*(1-2), 76–81. https://doi.org/10.1159/000119004

König, L. M., Allmeta, A., Christlein, N., Van Emmenis, M., & Sutton, S. (2022). A systematic review and meta-analysis of studies of reactivity to digital in-the-moment measurement of health behaviour. *Health Psychology Review*, *16*(4), 551–575. https://doi.org/10.1080/17437199.2022.2047096

Kraft, P., & Kraft, B. (2021). Explaining socioeconomic disparities in health behaviours: A review of biopsychological pathways involving stress and inflammation. *Neuroscience & Biobehavioral Reviews*, *127*, 689–708. https://doi.org/10.1016/j.neubiorev.2021.05.019

Kuckuck, S., van der Valk, E. S., Scheurink, A. J. W., van der Voorn, B., Iyer, A. M., Visser, J. A., Delhanty, P. J. D., van den Berg, S. A. A., & van Rossum, E. F. C. (2023). Glucocorticoids, stress and eating: The mediating role of appetite-regulating hormones. *Obesity Reviews*, *24*(3), e13539. https://doi.org/10.1111/obr.13539

Kwasnicka, D., Boroujerdi, M., O'Gorman, A., Anderson, M., Craig, P., Bowman, L., & McCann, M. (2021). An N-of-1 study of daily alcohol consumption following minimum unit pricing implementation in Scotland. *Addiction*, *116*(7), 1725–1733. https://doi.org/10.1111/add.15382

Kwasnicka, D., Dombrowski, S. U., White, M., & Sniehotta, F. (2016). Theoretical explanations for maintenance of behaviour change: A systematic review of behaviour theories. *Health Psychology Review*, *10*(3), 277–296. https://doi.org/10.1080/17437199.2016.1151372

Laborde, S., Allen, M. S., Borges, U., Dosseville, F., Hosang, T. J., Iskra, M., Mosley, E., Salvotti, C., Spolverato, L., Zammit, N., & Javelle, F. (2022). Effects of voluntary slow breathing on heart rate and heart rate variability: A systematic review and a meta-analysis. *Neuroscience & Biobehavioral Reviews*, *138*, 104711. https://doi.org/10.1016/j.neubiorev.2022.104711

Laborde, S., Mosley, E., & Mertgen, A. (2018). Vagal tank theory: The three Rs of cardiac vagal control functioning – resting, reactivity, and recovery. *Frontiers in Neuroscience*, *12*, https://doi.org/10.3389/fnins.2018.00458

Laborde, S., Mosley, E., & Thayer, J. F. (2017). Heart rate variability and cardiac vagal tone in psychophysiological research – recommendations for experiment planning, data analysis, and data reporting. *Frontiers in Psychology*, *8*, https://doi.org/10.3389/fpsyg.2017.00213

Langener, A. M., Stulp, G., Jacobson, N. C., Costanzo, A., Jagesar, R. R., Kas, M. J., & Bringmann, L. F. (2024). It's all about timing: Exploring different temporal resolutions for analyzing digital-phenotyping data. *Advances in Methods and Practices in Psychological Science*, *7*(1), https://doi.org/10.1177/25152459231202677

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

Leme, A. C. B., Hou, S., Fisberg, R. M., Fisberg, M., & Haines, J. (2021). Adherence to food-based dietary guidelines: A systemic review of high-income and low- and middle-income countries. *Nutrients*, *13*(3), https://doi.org/10.3390/nu13031038

Li, Y., Deng, J., Lou, X., Wang, H., & Wang, Y. (2020). A daily diary study of the relationships among daily self-compassion, perceived stress and health-promoting behaviours. *International Journal of Psychology*, *55*(3), 364–372. https://doi.org/10.1002/ijop.12610

Liao, Y., Skelton, K., Dunton, G., & Bruening, M. (2016). A systematic review of methods and procedures used in ecological momentary assessments of diet and physical activity research in youth: An adapted STROBE checklist for reporting ema studies (CREMAS). *Journal of Medical Internet Research*, *18*(6), https://doi.org/10.2196/jmir.4954

Linden-Carmichael, A. N., Van Doren, N., Bray, B. C., Jackson, K. M., & Lanza, S. T. (2022). Stress and affect as daily risk factors for substance use patterns: An application of latent class analysis for daily diary data. *Prevention Science*, *23*(4), 598–607. https://doi.org/10.1007/s11121-021-01305-9

Lippke, S., Nigg, C. R., & Maddock, J. E. (2012). Health-promoting and health-risk behaviors: Theory-driven analyses of multiple health behavior change in three international samples. *International Journal of Behavioral Medicine*, *19*(1), 1–13. https://doi.org/10.1007/s12529-010-9135-4

Luk, J. W., Fairlie, A. M., & Lee, C. M. (2018). Daily-level associations between negative mood, perceived stress, and college drinking: Do associations differ by sex and fraternity/sorority affiliation? *Substance Use & Misuse*, *53*(6), 989–997. https://doi.org/10.1080/10826084.2017.1392980

Mahoney, J. J., Finomore, V. S., Marton, J. L., Ramadan, J., Hodder, S. L., Thompson-Lake, D. G. Y., Marsh, C. B., Koch-Gallup, N., Ranjan, M., & Rezai, A. R. (2023). Identifying biomarkers of drug use recurrence using wearable device technologies and phone applications. *Drug and Alcohol Dependence*, *249*, 110817. https://doi.org/10.1016/j.drugalcdep.2023.110817

Mason, T. B., Lavender, J. M., Wonderlich, S. A., Crosby, R. D., Engel, S. G., Mitchell, J. E., Crow, S. J., Le Grange, D., & Peterson, C. B. (2018). Examining a momentary mediation model of appearance-related stress, anxiety, and eating disorder behaviors in adult anorexia nervosa. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity*, *23*(5), 637–644. https://doi.org/10.1007/s40519-017-0404-y

Mehl, M. R., & Conner, T. S. (2011). *Handbook of research methods for studying daily life*. Guilford Press.

Mereish, E. H., Kuerbis, A., & Morgenstern, J. (2018). A daily diary study of stressful and positive events, alcohol use, and addiction severity among heavy drinking sexual minority men. *Drug and Alcohol Dependence*, *187*, 149–154. https://doi.org/10.1016/j.drugalcdep.2018.03.003

Mereish, E. H., Treloar Padovano, H., Parlette, B., & Miranda, R. (2022). Momentary associations among minority stress, craving, affect, and nicotine use among sexual minority youth. *Journal of Clinical Child and Adolescent Psychology*, *51*(6), 877–891. https://doi.org/10.1080/15374416.2022.2093208

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M. P., Cane, J., & Wood, C. E. (2013). The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions. *Annals of Behavioral Medicine*, *46*(1), 81–95. https://doi.org/10.1007/s12160-013-9486-6

Minami, H., Frank, B. E., Bold, K. W., & McCarthy, D. E. (2018). Ecological momentary analysis of the relations among stressful events, affective reactivity, and smoking among smokers with high versus low depressive symptoms during a quit attempt. *Addiction*, *113*(2), 299–312. https://doi.org/10.1111/add.13964

Minami, H., McCarthy, D. E., Jorenby, D. E., & Baker, T. B. (2011). An ecological momentary assessment analysis of relations among coping, affect and smoking during a quit attempt. *Addiction*, *106*(3), 641–650. https://doi.org/10.1111/j.1360-0443.2010.03243.x

Moss, R. H., Conner, M., & O'Connor, D. B. (2021). Exploring the effects of daily hassles and uplifts on eating behaviour in young adults: The role of daily cortisol levels. *Psychoneuroendocrinology*, *129*, 105231. https://doi.org/10.1016/j.psyneuen.2021.105231

Murray, C. J. L., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abegaz, K. H., Abolhassani, H., Aboyans, V., Abreu, L. G., Abrigo, M. R. M., Abualhasan, A., Abu-Raddad, L. J., Abushouk, A. I., Adabi, M., … Lim, S. S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: A systematic analysis for the global burden of disease study 2019. *The Lancet*, *396*(10258), 1223–1249. https://doi.org/10.1016/S0140-6736(20)30752-2

Nahum-Shani, I., Smith, S. N., Spring, B. J., Collins, L. M., Witkiewitz, K., Tewari, A., & Murphy, S. A. (2018). Just-in-time adaptive interventions (JITAIs) in mobile health: Key components and design principles for ongoing health behavior support. *Annals of Behavioral Medicine*, *52*(6), 446–462. https://doi.org/10.1007/s12160-016-9830-8

Naya, C. H., Zink, J., Huh, J., Dunton, G. F., & Belcher, B. R. (2021). Examining the same-day relationship between morning cortisol after awakening, perceived stress in the morning, and physical activity in youth. *Stress*, *24*(3), 338–347. https://doi.org/10.1080/10253890.2020.1804852

Nezlek, J. B. (2017). A practical guide to understanding reliability in studies of within-person variability. *Journal of Research in Personality*, *69*, 149–155. https://doi.org/10.1016/j.jrp.2016.06.020

Ng, D. M., & Jeffery, R. W. (2003). Relationships between perceived stress and health behaviors in a sample of working adults. *Health Psychology*, *22*(6), 638–642. https://doi.org/10.1037/0278-6133.22.6.638

Nguyen-Michel, S. T., Unger, J. B., Hamilton, J., & Spruijt-Metz, D. (2006). Associations between physical activity and perceived stress/hassles in college students. *Stress and Health*, *22*(3), 179–188. https://doi.org/10.1002/smi.1094

O'Connor, D. B., Conner, M., Jones, F., McMillan, B., & Ferguson, E. (2009). Exploring the benefits of conscientiousness: An investigation of the role of daily stressors and health behaviors. *Annals of Behavioral Medicine*, *37*(2), 184–196. https://doi.org/10.1007/s12160-009-9087-6

O'Connor, D. B., & Ferguson, E. (2016). Stress and stressors. In Y. Benyamini, M. Johnston, & E. C. Karademas (Eds.), *Assessment in health psychology* (pp. 103–117). Hogrefe.

O'Connor, D. B., Jones, F., Conner, M., McMillan, B., & Ferguson, E. (2008). Effects of daily hassles and eating style on eating behavior. *Health Psychology*, *27*(1, Suppl), 20–31. https://doi.org/10.1037/0278-6133.27.1.S20

O'Connor, D. B., Thayer, J. F., & Vedhara, K. (2021). Stress and health: A review of psychobiological processes. *Annual Review of Psychology*, *72*(1), 663–688. https://doi.org/10.1146/annurev-psych-062520-122331

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Systematic Reviews*, *10*(1), 89. https://doi.org/10.1186/s13643-021-01626-4

Park, C. L., Armeli, S., & Tennen, H. (2004). The daily stress and coping process and alcohol use among college students. *Journal of Studies on Alcohol*, *65*(1), 126–135. https://doi.org/10.15288/jsa.2004.65.126

Park, C. L., Kwan, J., & Gnall, K. (2023). How are relying on religion and on science to make sense of the world associated with health-related resources and behaviors and well-being? *Psychology & Health*, *40*(3), 454–473. https://doi.org/10.1080/08870446.2023.2234407

Pelletier, J. E., Lytle, L. A., & Laska, M. N. (2016). Stress, health risk behaviors, and weight status among community college students. *Health Education & Behavior*, *43*(2), 139–144. https://doi.org/10.1177/1090198115598983

Perski, O., Theodoraki, M., Cox, S., Kock, L., Shahab, L., & Brown, J. (2022). Associations between smoking to relieve stress, motivation to stop and quit attempts across the social spectrum: A population survey in England. *PLoS One*, *17*(5), https://doi.org/10.1371/journal.pone.0268447

Quigley, J. M., Thompson, J. C., Halfpenny, N. J., & Scott, D. A. (2019). Critical appraisal of nonrandomized studies - a review of recommended and commonly used tools. *Journal of Evaluation in Clinical Practice*, *25*(1), 44–52. https://doi.org/10.1111/jep.12889

Ranzenhofer, L. M., Solhjoo, S., Crosby, R. D., Kim, B. H., Korn, R., Koorathota, S., Lloyd, E. C., Walsh, B. T., & Haigney, M. C. (2022). Autonomic indices and loss-of-control eating in adolescents: An ecological momentary assessment study. *Psychological Medicine*, *53*(10), 4742–4750. https://doi.org/10.1017/S0033291722001684

Reichenberger, J., Pannicke, B., Arend, A.-K., Petrowski, K., & Blechert, J. (2021). Does stress eat away at you or make you eat? EMA measures of stress predict day to day food craving and perceived food intake as a function of trait stress-eating. *Psychology & Health*, *36*(2), 129–147. https://doi.org/10.1080/08870446.2020.1781122

Rhodes, R. E., Janssen, I., Bredin, S. S. D., Warburton, D. E. R., & Bauman, A. (2017). Physical activity: Health impact, prevalence, correlates and interventions. *Psychology & Health*, *32*(8), 942–975. https://doi.org/10.1080/08870446.2017.1325486

Rhodes, R. E., & Lithopoulos, A. (2023). The Physical activity regulation scale: Development and validity testing. *Health Psychology*, *42*(6), 378–387. https://doi.org/10.1037/hea0001283

Savoy, E. J., Businelle, M. S., Nguyen, N., Chen, T.-A., Neighbors, C., Norton, P. J., Taing, M., & Reitzel, L. R. (2021). Examining moment to moment affective determinants of smoking rate following a quit attempt among homeless daily smokers. *Addictive Behaviors*, *115*, 106788. https://doi.org/10.1016/j.addbeh.2020.106788

Schilling, R., Cody, R., Ludyga, S., Brand, S., Faude, O., Pühse, U., & Gerber, M. (2022). Does dispositional self-control moderate the association between stress at work and physical activity after work? A real-life study with police officers. *German Journal of Exercise and Sport Research*, *52*(2), 290–299. https://doi.org/10.1007/s12662-022-00810-5

Schlotz, W. (2019). Investigating associations between momentary stress and cortisol in daily life: What have we learned so far? *Psychoneuroendocrinology*, *105*, 105–116. https://doi.org/10.1016/j.psyneuen.2018.11.038

Schultchen, D., Reichenberger, J., Mittl, T., Weh, T. R. M., Smyth, J. M., Blechert, J., & Pollatos, O. (2019). Bidirectional relationship of stress and affect with physical activity and healthy eating. *British Journal of Health Psychology*, *24*(2), 315–333. https://doi.org/10.1111/bjhp.12355

Schuurman, N. K., & Hamaker, E. L. (2019). Measurement error and person-specific reliability in multilevel autoregressive modeling. *Psychological Methods*, *24*(1), 70–91. https://doi.org/10.1037/met0000188

Segerstrom, S. C., & O'Connor, D. B. (2012). Stress, health and illness: Four challenges for the future. *Psychology & Health*, *27*(2), 128–140. https://doi.org/10.1080/08870446.2012.659516

Sezer, B., & Öner, S. (2023). An online diary study testing the role of functional and dysfunctional self-licensing in unhealthy snacking. *Appetite*, *181*, 106389. https://doi.org/10.1016/j.appet.2022.106389

Sheng, R., Yang, X., Zhou, Y., Liu, X., & Xu, W. (2023). COVID-19 and eating problems in daily life: The mediating roles of stress, negative affect and posttraumatic stress symptoms. *Psychological Reports*, *126*(1), 34–51. https://doi.org/10.1177/00332941211045315

Shiffman, S., Scholl, S. M., Mao, J., Ferguson, S. G., Hedeker, D., & Tindle, H. A. (2020). Ecological momentary assessment of temptations and lapses in non-daily smokers. *Psychopharmacology*, *237*(8), 2353–2365. https://doi.org/10.1007/s00213-020-05539-3

Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology*, *4*(1), 1–32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415

Shrout, P. E., Stadler, G., Lane, S. P., McClure, M. J., Jackson, G. L., Clavél, F. D., Iida, M., Gleason, M. E. J., Xu, J. H., & Bolger, N. (2018). Initial elevation bias in subjective reports. *Proceedings of the National Academy of Sciences*, *115*(1), https://doi.org/10.1073/pnas.1712277115

Smith, E. R., & DeCoster, J. (2000). Dual-Process Models in Social and Cognitive Psychology: Conceptual Integration and Links to Underlying Memory Systems. *Personality and Social Psychology Review*, *4*(2), 108–131. https://doi.org/10.1207/S15327957PSPR0402_01

Smith, K. E., Mason, T. B., Schaefer, L. M., Anderson, L. M., Critchley, K., Crosby, R. D., Engel, S. G., Crow, S. J., Wonderlich, S. A., & Peterson, C. B. (2021). Dynamic stress responses and real-time symptoms in binge-eating disorder. *Annals of Behavioral Medicine*, *55*(8), 758–768. https://doi.org/10.1093/abm/kaaa061

Smyth, J. M., Sliwinski, M. J., Zawadzki, M. J., Scott, S. B., Conroy, D. E., Lanza, S. T., Marcusson-Clavertz, D., Kim, J., Stawski, R. S., Stoney, C. M., Buxton, O. M., Sciamanna, C. N., Green, P. M., & Almeida, D. M. (2018). Everyday stress response targets in the science of behavior change. *Behaviour Research and Therapy*, *101*, 20–29. https://doi.org/10.1016/j.brat.2017.09.009

Sominsky, L., & Spencer, S. J. (2014). Eating behavior and stress: A pathway to obesity. *Frontiers in Psychology*, *5*, https://doi.org/10.3389/fpsyg.2014.00434

Sorys, K., & Byrka, K. (2021). Acting inconsistently with an important goal predicts compensatory health behaviors through regret. *Appetite*, *163*, 105217. https://doi.org/10.1016/j.appet.2021.105217

Spears, C. A., Li, L., Wu, C., Vinci, C., Heppner, W. L., Hoover, D. S., Lam, C., & Wetter, D. W. (2019). Mechanisms linking mindfulness and early smoking abstinence: An ecological momentary assessment study. *Psychology of Addictive Behaviors*, *33*(3), 197–207. https://doi.org/10.1037/adb0000451

Stadler, G., Chesaniuk, M., Haering, S., Roseman, J., Straßburger, V. M., Martina, S., Aisha-Nusrat, A., Maisha, A., Kasia, B., Theda, B., Pichit, B., Marc, D., Sally, D. M., Ruth, D., Ilona, E., Marina, F., Paul, G., Denis, G., Ulrike, G., … Mine, W. (2023). Diversified innovations in the health sciences: Proposal for a Diversity Minimal Item Set (DiMIS). *Sustainable Chemistry and Pharmacy*, *33*, 101072. https://doi.org/10.1016/j.scp.2023.101072

Standen, E. C., Finch, L. E., Tiongco-Hofschneider, L., Schopp, E., Lee, K. M., Parker, J. E., Bamishigbin, O. N., & Tomiyama, A. J. (2022). Healthy versus unhealthy comfort eating for psychophysiological stress recovery in low-income Black and Latinx adults. *Appetite*, *176*, 106140. https://doi.org/10.1016/j.appet.2022.106140

Steptoe, A., Wardle, J., Pollard, T. M., Canaan, L., & Davies, G. J. (1996). Stress, social support and health-related behavior: A study of smoking, alcohol consumption and physical exercise. *Journal of Psychosomatic Research*, *41*(2), 171–180. https://doi.org/10.1016/0022-3999(96)00095-5

Stoffel, M., Abbruzzese, E., Rahn, S., Bossmann, U., Moessner, M., & Ditzen, B. (2021). Covariation of psychobiological stress regulation with valence and quantity of social interactions in everyday life: Disentangling intra- and interindividual sources of variation. *Journal of Neural Transmission (Vienna, Austria: 1996)*, *128*(9), 1381–1395. https://doi.org/10.1007/s00702-021-02359-3

Stone, A. A., & Neale, J. M. (1982). Development of a methodology for assessing daily experiences. In A. Baum & J. Singer (Eds.), *Advances in environmental psychology: Environment and health* (Vol. 4, pp. 49–83). Erlbaum.

Stults-Kolehmainen, M. A., & Sinha, R. (2014). The effects of stress on physical activity and exercise. *Sports Medicine*, *44*(*1*), 81–121. https://doi.org/10.1007/s40279-013-0090-5

Taouk, Y., Spittal, M. J., LaMontagne, A. D., & Milner, A. J. (2020). Psychosocial work stressors and risk of all-cause and coronary heart disease mortality: A systematic review and meta-analysis. *Scandinavian Journal of Work, Environment & Health*, *46*(1), 19–31. https://doi.org/10.5271/sjweh.3854

Thayer, J. F., Åhs, F., Fredrikson, M., Sollers, J. J., & Wager, T. D. (2012). A meta-analysis of heart rate variability and neuroimaging studies: Implications for heart rate variability as a marker of stress and health. *Neuroscience & Biobehavioral Reviews*, *36*(2), 747–756. https://doi.org/10.1016/j.neubiorev.2011.11.009

Thayer, J. F., Hansen, A. L., Saus-Rose, E., & Johnsen, B. H. (2009). Heart rate variability, prefrontal neural function, and cognitive performance: The neurovisceral integration perspective on self-regulation, adaptation, and health. *Annals of Behavioral Medicine*, *37*(2), 141–153. https://doi.org/10.1007/s12160-009-9101-z

Torres, S. J., & Nowson, C. A. (2007). Relationship between stress, eating behavior, and obesity. *Nutrition*, *23*(11), 887–894. https://doi.org/10.1016/j.nut.2007.08.008

Torres, O. V., & O'Dell, L. E. (2016). Stress is a principal factor that promotes tobacco use in females. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *65*, 260–268. https://doi.org/10.1016/j.pnpbp.2015.04.005

Trull, T. J., & Ebner-Priemer, U. (2014). The role of ambulatory assessment in psychological science. *Current Directions in Psychological Science*, *23*(6), 466–470. https://doi.org/10.1177/0963721414550706

Ursin, H., & Eriksen, H. R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology*, *29*(5), 567–592. https://doi.org/10.1016/S0306-4530(03)00091-X

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Weber, J., Angerer, P., & Apolinário-Hagen, J. (2022). Physiological reactions to acute stressors and subjective stress during daily life: A systematic review on ecological momentary assessment (EMA) studies. *PLoS One*, *17*(7), https://doi.org/10.1371/journal.pone.0271996

Wemm, S. E., Tennen, H., Sinha, R., & Seo, D. (2022). Daily stress predicts later drinking initiation via craving in heavier social drinkers: A prospective in-field daily diary study. *Journal of Psychopathology and Clinical Science*, *131*(7), 780–792. https://doi.org/10.1037/abn0000771

Wenze, S. J., & Miller, I. W. (2010). Use of ecological momentary assessment in mood disorders research. *Clinical Psychology Review*, *30*(6), 794–804. https://doi.org/10.1016/j.cpr.2010.06.007

World Health Organization. (2021). *WHO report on the global tobacco epidemic 2021: Addressing new and emerging products*. https://www.who.int/publications/i/item/9789240032095.

World Health Organization. (2024). *Global status report on alcohol and health and treatment of substance use disorders*. https://www.who.int/publications/i/item/9789240096745.

Zawadzki, M. J., Scott, S. B., Almeida, D. M., Lanza, S. T., Conroy, D. E., Sliwinski, M. J., Kim, J., Marcusson-Clavertz, D., Stawski, R. S., Green, P. M., Sciamanna, C. N., Johnson, J. A., & Smyth, J. M. (2019). Understanding stress reports in daily life: A coordinated analysis of factors associated with the frequency of reporting stress. *Journal of Behavioral Medicine*, *42*(3), 545–560. https://doi.org/10.1007/s10865-018-00008-x

Zellner, D. A., Saito, S., & Gonzalez, J. (2007). The effect of stress on men's food selection. *Appetite*, *49*(3), 696–699. https://doi.org/10.1016/j.appet.2007.06.013

Zenk, S. N., Horoi, I., McDonald, A., Corte, C., Riley, B., & Odoms-Young, A. M. (2014). Ecological momentary assessment of environmental and personal factors and snack food intake in African American women. *Appetite*, *83*, 333–341. https://doi.org/10.1016/j.appet.2014.09.008