The Living SEB Skills Project: A Living Resource for Review and Meta-Analysis of Social, Emotional, and Behavioral Skills

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The study was preregistered at feracotommaso.github.io/living_SEB_review/preregistration

Data, code, and materials are available at https://github.com/feracotommaso/living_SEB_review and at https://doi.org/10.5281/zenodo.19101246.

An overview of the database and updated results of the same analyses are available as a blog post at: https://feracotommaso.github.io/living_SEB_review/paper/livingSEBresults.html.

The *Living SEB App* is available at https://feracotommaso.github.io/living_SEB_review/shiny-app.html.

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Abstract

The social, emotional, and behavioral (SEB) skills framework was recently proposed as an integrative model for soft skills/socio-emotional competencies, clarifying their definition and distinction from personality traits. To support open and cumulative research in this area, we introduce the Living SEB Skills Project, a continuously updated database combining ongoing literature searches, an open repository of coded studies and effect sizes, and an interactive application enabling customizable meta-analyses. Using meta-analyses of correlations and meta-analytic structural equation models, we demonstrate the database's utility by testing the predictive and incremental validity of SEB skills for academic achievement on the current available data (364 publications, of which 30 met the criteria for the living review and 19 [26 samples] for the quantitative synthesis). The Living SEB Skills Project sets out as a transparent, dynamic and openly accessible tool to accelerate and ease cumulative science and synthesis within the SEB skills framework and beyond.

Keywords: meta-analysis; systematic review; living review; socio-emotional skills; open science

Introduction

Social, emotional, and behavioral (SEB) skills–sometimes referred to as "soft skills," "21st-century skills," or "social-emotional skills"–are increasingly recognized as essential for success, well-being, and social functioning (Feraco et al., 2023; Heckman & Kautz, 2012). Only in recent years, however, new frameworks have begun to address the field's long-standing challenges of fragmented conceptualizations and reliance on personality trait measures (Abrahams et al., 2019; Guo et al., 2023; Soto et al., 2022). In particular, Soto and colleagues (2021) proposed the SEB framework and the Behavioral, Emotional, and Social Skills Inventory [BESSI; Soto et al. (2022)], defining and assessing SEB skills as functional capacities, distinct from but complementary to personality traits. This progress has created a novel and timely opportunity to accelerate research on SEB skills starting from a valid, integrative, and common framework.

Nonetheless, psychology, like many other sciences, still faces broad methodological challenges, including the absence of infrastructures that make knowledge cumulative, dynamic, and accessible (Bosco et al., 2020). Indeed, we usually rely on traditional meta-analyses and systematic reviews, which provide rigorous summaries of evidence but are narrow in scope and static by design. Given the accelerating pace of publication, they often become outdated within just a few years (Elliott et al., 2014; Elliott et al., 2017; Sakaluk et al., 2023). As a result, both old and new promising frameworks–such as SEB skills–risk fragmentation or premature stagnation if evidence cannot be continually updated and integrated.

To address this challenge, the concept of *living systematic reviews* has been developed to propose that reviews and meta-analyses are continually updated as new studies are published (Elliott et al., 2017). However, their adoption in psychology has been limited, and no living

meta-analysis has yet been devoted to SEB skills. This gap is particularly striking given that SEB skills research is a young and rapidly growing field, precisely where static reviews are not conducted and selective reporting might prove particularly impacting, given potential conflicts of interests toward the initial expansion and adoption of the model.

In light of these general limitations, the present article introduces the *Living SEB Skills Project*: a research infrastructure for cumulative SEB skills science. This initiative integrates (a) ongoing systematic literature searches, (b) centralized open databases of coded study information and effect sizes, and (c) a user-friendly web application for customized reviews and meta-analyses. Together, these tools provide researchers, reviewers, editors, and practitioners with continually updated, openly accessible evidence on SEB skills.

To illustrate the substantive and theoretical utility of the *Living SEB Skills Project* and its tools, we also present direct analyses of the current database that test predictive and incremental validity of SEB skills for academic achievement: a multilevel meta-analysis of the associations between SEB domains and academic achievement, and two meta-analytic structural equation models testing incremental validity of each SEB skill beyond personality traits and beyond the other SEB skills included in the model.

Our overarching goal is to prevent SEB skills research from repeating the familiar cycle of selective reporting, fragmentation, and stagnation of many different fields in psychology.

Social, Emotional, and Behavioral Skills

The *Living SEB Skills Project* is grounded in the conceptualization of SEB skills proposed by Soto and colleagues (2021; 2022). In this framework, SEB skills are defined as the functional capacities individuals can draw upon to build relationships, pursue goals, think creatively, and regulate their emotions. After reviewing the various theoretical models of skills

presented in the literature, Soto and colleagues (2022) identified 32 skills and organized them into five broad domains derived from the Big Five model of personality traits (McCrae & Costa, 1989). Importantly, skills are clearly distinguished from personality traits: whereas traits capture enduring patterns of thoughts, feelings, and behaviors, skills reflect what individuals *can do when required*. For example, a person may typically avoid public speaking (a trait tendency) but still be able to deliver an effective presentation when needed (a skill capacity).

The five SEB skills domains, paralleling the Big Five personality traits, comprise:

- Innovation skills, including the capacities used to process and engage with novel ideas and experiences (linked to the openness personality trait).
- Self-management skills, including the capacities used to manage and complete goal-related tasks (linked to the conscientiousness personality trait).
- Social engagement skills, including the capacities used to actively and efficiently engage and communicate with other people (linked to the extraversion personality trait).
- Cooperation skills, including the capacities used to maintain positive social relationships (linked to the agreeableness personality trait).
- Emotional resilience skills, including the capacities used to regulate emotions and moods (linked to the emotional stability personality trait).

To assess these skills, the Behavioral, Emotional, and Social Skills Inventory (BESSI) was developed utilizing items that are phrased to measure capacities ("How well can you…?") rather than frequencies ("How often do you…?") and effectively distinguishing skills from traits (Soto et al., 2022). Indeed, SEB skills show both overlap with, and incremental validity beyond, personality traits (Chen et al., 2024; Feraco et al., 2024; Lechner et al., 2022; Postigo et al., 2024; Soto et al., 2023; Soto et al., 2024; Yoon et al., 2024). Additionally, skills–traits

mismatches (e.g., high extraversion but low social engagement skills) predict unique outcomes for adolescents (Ringwald et al., 2025). For instance, students whose skills exceeded their traits (i.e., individuals who do not typically engage in a behavior but are nonetheless proficient at it) reported better outcomes than those whose traits exceeded their skills (i.e., individuals who often engage in a behavior but are not particularly skilled at it). Evidence also suggests that skills and traits follow similar but distinct developmental trajectories (Feraco & Meneghetti, 2023; Napolitano et al., 2025), and laypeople perceive them as meaningfully different constructs (Feraco, Hudson, et al., 2025).

Despite this progress, studies adopting the SEB skills framework already display considerable heterogeneity, making them difficult to synthesize. For instance, some studies have sought to expand the framework's nomological network by considering all SEB facets and domains (Postigo et al., 2024; Soto et al., 2024), whereas others have focused on specific skill facets (Breil et al., 2022; Collie & Ryan, 2025). In such a rapidly developing area, relying on static reviews or individual literature searches risks selective citation, cherry-picking of results, and conceptual fragmentation. To mitigate these risks, we propose a living and cumulative approach to synthesizing SEB research.

Introducing Living Research Infrastructure for Cumulative Science

Current approaches to theoretical and quantitative synthesis of scientific materials mainly rely on meta-analyses and systematic reviews. However, especially in view of the steeply increasing number of publications, both of them become outdated soon, requiring recurring updates. These are often conducted by different authors and, even if data sharing is becoming common nowadays, building on previous meta-analysis often requires running a new database search or coding additional information leading new authors to run meta-analysis (even on the

same effect) from scratch. This results in duplicate screening of materials, loss of resources and time, and potentially increased human error (Bosco et al., 2015; Elliott et al., 2017).

To overcome these issues, living meta-analysis and databases are now appearing in the literature, especially for medical studies, clinical trials, and interventions (Bosco et al., 2015; Cuijpers et al., 2022; Elliott et al., 2014; Howard & Slemp, 2025; Sakaluk et al., 2023; Spadaro et al., 2022). These approaches usually maintain a continually updated database of eligible studies, alongside transparent procedures for incorporating new evidence. They are particularly beneficial for rapidly evolving fields where timely integration of knowledge is critical, as showed by the many living reviews appeared during COVID-19. Nonetheless, these systems usually rely on users to upload new data or remain limited to very narrow topics or effects. An exception is the massive attempt of semi-automated data collection and synthesis represented by the *metaBUS* project (Bosco et al., 2020) in which correlation matrices of published studies in Organizational Psychology are systematically integrated into a common database for rapid integration, description, and synthesis. With our proposal, we aim to contribute to these efforts introducing a living platform for review and meta-analysis on SEB skills that overcome some previous limitations by (a) covering a new and comprehensive research framework, similarly to what Howard and colleagues proposed (2025), and (b) making the database update systematic, thus following Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines [PRISMA; Moher et al. (2015)] repeatedly across time.

Providing a similar tool would speed up and facilitate researchers' literature search, support a standardized and evidence-based understanding of the literature, and inform future research. Given the recency of the framework, fragmentation risks, and rapid expansion of this new research area, SEB skills represent an ideal case for introducing a living review system.

Rationale, aims, and hypotheses

The *Living SEB Skills Project* is designed to create a sustainable, transparent, and cumulative infrastructure for synthesizing SEB skills research. Its development rests on three core rationales: (i) Preventing fragmentation, (ii) enabling timely integration, (iii), and advancing open science. Indeed, meta-analysis and reviews are rare for new emerging frameworks as, understandably, authors run them when enough publications are available. However, without cumulative tools since its inception, the SEB research risks repeating the cycle seen in other fields where inconsistent findings and selective reporting hinder theoretical progress, until meta-analyses start integrating the literature. A living research infrastructure provides a means to keep pace with ongoing rapid publication processes and to ensure that syntheses remain relevant and comprehensive. However, to maximize transparency and accessibility, cumulative evidence must be not only easy to access, but also easily available and usable. Researchers, reviewers, and practitioners need tools that allow them to rapidly interact with data, run analyses, and test claims without advanced technical expertise or tedious processes of data collection. To achieve these goals, we provide a continuously updated database and developed the *Living SEB App*, a user-friendly web platform that integrates literature search, data visualization, and statistical analysis. The app embodies the open-science ethos of the project: it ensures that cumulative evidence is accessible to the entire community by lowering technical barriers and providing reproducible outputs.

Accordingly, the *Living SEB Skills Project* has three main aims:

- **Review aim:** To provide a living and organized map of SEB skills literature, freely accessible and filterable by topic, population (e.g., adolescents or adults), or publication years.

- **Meta-analytic aim:** To offer pre-processed database to continually synthesize associations between SEB skills and all other constructs and variables measured alongside, starting with cross-sectional correlations but expandable to longitudinal and experimental data.
- **Open Science aim:** To provide, together with open materials, the Living SEB App, an open-access, interactive platform that integrates the database and analysis tools, enabling replication, rapid evidence checks, preregistration support, and community contributions.

To demonstrate feasibility of the project and show its potential for theory building and testing, we also test the predictive and incremental validity of SEB skills for academic achievement running multiple meta-analysis with the data produced by the *Living SEB Skills Project* to date. In particular, we use both multilevel meta-analysis of correlations and meta-analytic structural equation modeling (MASEM).

Methods

Transparency and Openness

All past and future procedures for this project are preregistered and publicly available on GitHub. The repository (https://github.com/feracotommaso/living_SEB_review) also hosts all materials, data, and R code used in this article. All materials are also available on Zenodo (https://doi.org/10.5281/zenodo.19101246), where snapshots of monthly Git releases will be identified with specific DOIs for future use (e.g., for studies that need to reference the exact version of the *Living SEB Skills Project* used in their analyses). Analyses will strictly follow the preregistration unless otherwise noted. The systematic search and review is conducted according to the PRISMA guidelines (Moher et al., 2015).

Search Strategy

The comprehensive literature search was conducted and will be conducted monthly on two electronic databases: Web of Science (WOS) and Scopus. To balance comprehensiveness with feasibility, we adopted a citation-chaining strategy (Hirt et al., 2023): all papers citing one or more seminal theoretical or measurement works on SEB skills were (and will be) retrieved. This strategy ensures that all studies using the SEB skills framework or BESSI measures are captured while reducing noise from unrelated keyword-based searches. While efficient, this approach may overlook studies that deviate from standard research guidelines and measure or reference SEB skills without citing either the seminal works or the validation and measurement papers. To mitigate this risk, the database is continuously updated, and authors are encouraged to submit missing studies (see guidelines for submission on GitHub).

The initial reference papers included in the search string cover theoretical basis (Soto et al., 2021), original measurement papers (Soto et al., 2022), their cultural and language adaptations (Feraco et al., 2024; Lechner et al., 2022; Postigo et al., 2024), and shorter versions of the BESSI (Sewell et al., 2024). For readability, the full search string is available in the Supplementary materials (Table S1) and in the preregistration protocol. The search string will be updated when new measurement or basic theoretical papers are published (see Table S2 in the Supplementary materials).

Study Eligibility Criteria

Studies are considered for inclusion in the database if their main focus is SEB skills and/or they collect data using BESSI-based measures. Works are excluded if they cite the reference papers but do not focus on the SEB skills framework and do not use any BESSI measures. For example, articles mentioning the SEB skills framework but assessing skills

derived from other frameworks, such as the OECD (OECD, 2021) or CASEL (Payton et al., 2000), are not considered for inclusion. Similarly, studies focusing solely on other constructs are excluded even if they cite the reference papers. However, if a study examines a different construct but also collects ancillary data using the BESSI, it is included in the meta-analysis. Publications are also excluded if they are published as theses, conference abstracts, or books. Data publications are included if the data are not already included in an indexed study.

To be included in the quantitative database, studies also have to:

1. Be written in a language comprehensible to the authors (i.e., English, Italian, and Spanish);
2. Include original quantitative data using a validated or translated BESSI-based measure;
3. Report correlations, raw data, or provide correlations/data after authors' request;
4. Include original data not already reported in other included studies.

Contrarily, a study is excluded from the quantitative database for meta-analysis if:

1. Data are duplicated across publications;
2. Measures are not validated or outside the SEB skills and BESSI framework;
3. The study does not report correlations at baseline or data cannot be reduced to correlations.

The inclusion criteria delineated will be adopted throughout the lifetime of this project.

Coding Procedures

For each included study, the following information was systematically coded:

- *Bibliographic metadata*: DOI, title, authors, journal, year, and download date.
- *Paper, sample, and matrix IDs*: The unique progressive identifiers of each paper, sample, and correlation matrix.

- *Exclusion reason:* both for the review and the meta-analysis.
- *Review topics*: The main topics covered by the study.
- *Open data*: Whether data is openly available or not and the link to the data.
- *Study design*: Whether the study is cross-sectional, longitudinal, or experimental.
- *Country*: Country of origin of the participants. In case participants from multiple countries were included in the same sample, the sample was coded as "mixed".
- *Gender*: The percentage of females.
- *Age*: The mean age of the sample.
- *Sample size*: The sample size of each population on which correlations were estimated.
- *Age category:* An additional category was added to distinguish between samples of primary school students, secondary school students, young adults (university students or younger than 30), adults (younger than 55) older adults (55 or older). The "Adults" category was used also if the study included participants of all ages or between 19 and 55 years old.
- *Clinical population*: Samples are divided between clinical populations and non-clinical populations. In case a clinical population was included, we specify the diagnosis.
- *SEB measure*: BESSI 192, 96, 45, 20 or other versions.
- *Measure type*: Long (if it measures facets) or short (if it only measures domains).
- *Trait framework*: In case personality traits are measured, whether they are measured with a BF measure or an HEXACO measure.
- *Effect sizes*: The entire Pearson's correlations matrices among all study variables are extracted from the papers as measure of effect size. For papers including repeated

measurements on the same sample (e.g., longitudinal studies, intervention studies with pre/post assessment), the correlations matrix is extracted only from the first data collection.

- *Non-SEB indicators*. All measures, outcomes, and correlates are manually classified within the names of the correlation matrix. A codebook with all measures coded is available on the GitHub page of the project allowing categorizations of variables in specific and broader categories.

Updating Procedures and Timeline

To maintain the "living" nature of the project, the search and coding procedures are repeated on the first working day of each month to keep updates feasible and avoid large, onerous updates. New studies are added to the database and version-controlled monthly snapshots are archived in GitHub and Zenodo. If no eligible studies are published within a given month, a data release will still be issued, specifying that no new data were available. When new theoretical or measurement works are published, the seed references for the citation-chaining search are expanded accordingly. Additionally, at each new search, the database search will be limited by adding the day the last search was conducted as a starting search limit. To pilot the feasibility of this procedure, we already ran the monthly updates on multiple occasions without encountering time or processing difficulties. We thus retain that the current strategy for monthly updates is feasible with current available resources.

We currently expect to provide hand-processed monthly updates of the database until 2030, while working on expanding the collaborative efforts from the community and integrating semi-automized processes for the future.

The Living SEB App

In parallel with the database, we developed the *Living SEB App*, a Shiny-based web platform that provides direct access to the database and analytic tools. The app enables users to:

- Search and filter literature by topic, population, or design;
- Run meta-analyses of SEB skills associations with outcomes, using multilevel models;
- Conduct meta-analytic structural equation modeling (MASEM) for incremental validity analyses or for estimating more complex correlation matrices;
- Download datasets and correlation matrices for further analyses;
- Generate reproducible reports to support preregistration, peer review, and editorial decision-making.

The app is hosted openly and mirrored on GitHub to ensure sustainability and version control. While designed to lower barriers for non-technical users, the raw datasets and R code remain freely available for advanced or customized analyses.

The *Living SEB App* is available at https://feracotommaso.github.io/living_SEB_review/shiny-app.html.

Results

Given the adaptive nature of the *Living SEB Skills Project*, the current results apply to the current database (March 2026: https://doi.org/10.5281/zenodo.19101247). An overview of the database and updated results of the same analyses on the latest release, together with additional

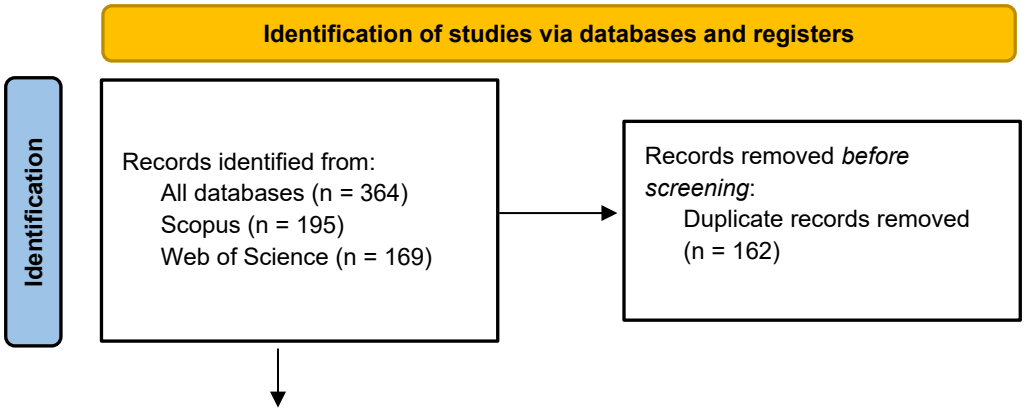
analyses, are available as a blog post at: https://feracotommaso.github.io/living_SEB_review/paper/livingSEBresults.html[1].

Database Overview

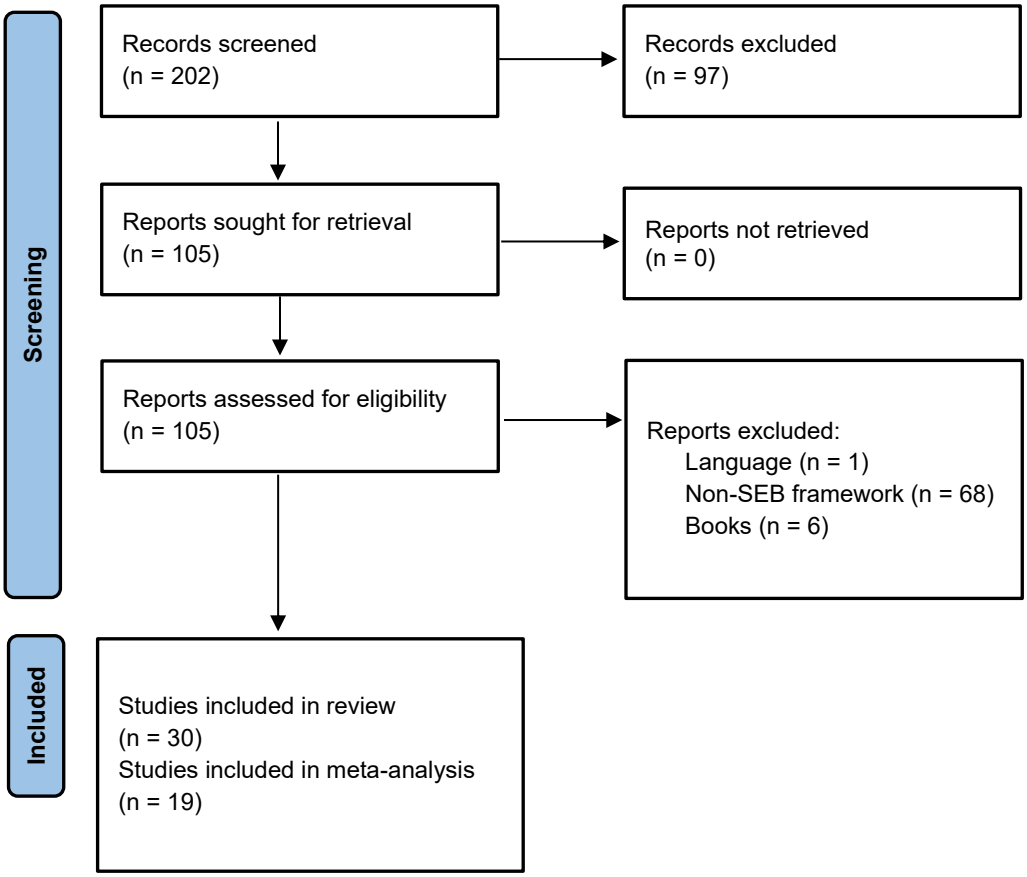
At the time of writing, the systematic search identified 364 publications (Scopus = 195; WOS = 169). After removing duplicates, screening titles and abstracts, and reviewing full texts, 30 studies were retained for the living review and 19 studies met criteria for quantitative synthesis. These include a total of 26 independent samples (see Figure 1), with sample sizes ranging from 137 to 5075 (median = 621). Main characteristics of all studies included in the review are reported in Table 1. The dataset used corresponds to the latest release available at the time of writing (March 2026: https://doi.org/10.5281/zenodo.19101247).

Figure 1

PRISMA flow chart.



[1] In case a researcher wants to cite updated results of the same analysis, we recommend citing this paper but specifying the release of the updated database



Across these studies, a total of 17221 correlation coefficients were coded, representing 5850 unique pairwise associations. Of these, 14292 correlations (3857 unique associations) involved at least one SEB domain or facet measured with a BESSI instrument. This provides the foundation for both the living database and the illustrative analyses reported below.

A continuously updated summary of descriptive statistics is available online at https://feracotommaso.github.io/living_SEB_review/paper/livingSEBresults.html.

Table 1

Studies included in the review

Authors	Year	Study design	Country	n	Group	Main focus
Beatty et al.	(2025)	Cross-sectional	United States	412	Young adults	Associations between sense of purpose and SEB skills in university students
Breil et al.	(2022)	Cross-sectional	Germany	137	Young adults	Associations between self- and observer- reports for three social skills
Chen et al.	(2024)	Cross-sectional	China	2,992	Adults	SEB skills and their incremental validity for job outcomes beyond personality traits
Collie & Ryan	(2025)	Cross-sectional	Australia	373	Secondary school	Parent-rated SEB skills and their associations with children perceived socio-emotional competence and autonomy support
De Fruyt et al.	(2025)	Theoretical				Conceptual and methodological challenges in SEB skills assessment and interventions
Feraco et al.	(2025a)	Cross-sectional	Italy	5,075	Secondary school	Associations between SEB skills and self-regulated learning factors
Feraco et al.	(2025b)	Cross-sectional	Italy	702	Secondary school	Associations between SEB skills and pro-environmental

Authors	Year	Study design	Country	n	Group	Main focus
						attitudes and behaviors
Feraco et al.	(2024)	Cross-sectional	Italy	1,814	Secondary school & Adults	Validation of the Italian version of the BESSI
Feraco et al.	(2025c)	Experimental	Italy, United States	264	Young adults	Change goals and perceived feasibility about changing SEB skills vs traits
Feraco & Meneghetti	(2023)	Cross-sectional	Germany, Italy, Unites States	4,106	Secondary school	Age and gender differences in SEB skills among adolescents
Feraco et al.	(2025d)	Cross-sectional	Italy	2,965	Secondary school	SEB skills in students with learning disabilities
Ichsan et al.	(2025)	Review				Systematic review on virtual-reality technology for SEB skills development
Lechner & Urban	(2025)	Cross-sectional	Germany	3,162	Secondary school	Inequalities in SEB skills by gender, SES, and migration background
Lechner et al.	(2022)	Cross-sectional	Germany	1,164	Adults	Validation of the German version of the BESSI
Napolitano et al.	(2021)	Theoretical				Integrative SEB model and its developmental importance in adolescence
Napolitano et al.	(2025)	Longitudinal	United States	942	Secondary school	Longitudinal changes in SEB skills and outcomes
Pellegrino et al.	(2026)	Cross-sectional	Italy	752	Young adults	Associations between SEB skills

Authors	Year	Study design	Country	n	Group	Main focus
						and university students' outcomes
Pellegrino et al.	(2025)	Cross-sectional	Italy	350	Secondary school	Associations between SEB skills and career adaptability
Postigo et al.	(2024)	Cross-sectional	Spain	303	Adults	Validation of the Spanish version of the BESSI
Ringwald et al.	(2025)	Cross-sectional	United States	840	Secondary school	Traits–skills (mis)matches and implications for youth outcomes
Sewell et al.	(2024)	Cross-sectional	Germany, United States	2,792	Secondary school, Young adults, Adults	Development and validation of short BESSI forms
Sewell et al.	(2026)	Longitudinal	Unites States	455	Young adults	Volunteering as predictor of SEB skills changes
Sewell et al.	(2023)	Longitudinal	United States	248	Young adults	SEB skills as predictors of volunteering during COVID-19
Sharabi et al.	(2025)	Cross-sectional	Israel, Italy, Spain	319	Young adults	Association between SEB skills and university student outcomes
Soto et al.	(2023)	Cross-sectional	United States	975	Secondary school	SEB skills and personality traits predicting academic success
Soto et al.	(2022)	Cross-sectional	United States	6,309	Secondary school, Young adults, Adults	Validation of the original BESSI
Soto et al.	(2024)	Cross-sectional	United States	897	Secondary school	Associations between SEB skills and multiple

Authors	Year	Study design	Country	n	Group	Main focus
						adolescents'outcomes
Vega-Dienstmaier et al.	(2024)	Cross-sectional	Peru	625	Secondary school	Validation of the Peruvian version of the Resilience Subscale of the BESSI
Walton et al.	(2024)	Cross-sectional	United States	474	Secondary school	Assessment challenges in differentiating skills vs traits
Yoon et al.	(2024)	Cross-sectional	United States	642	Secondary school	SEB skills and their incremental validity for academic achievement beyond personality traits

Multilevel Meta-analysis of Correlations

As a demonstration of the project's multilevel meta-analytic pipeline, we tested the associations between the five SEB skill domains and academic achievement. Following preregistered procedures, a three-level random-effects model was used, with effects nested within samples and studies. In line with Borenstein and colleagues (2021), Fisher's *z* transformations were applied and then back-transformed to Pearson's *r* for interpretation. The *metafor* package was used for the meta-analysis (Viechtbauer, 2010).

A total of 50 effect sizes from 9 studies and 10 samples were included. For each SEB domain, the median available sample size was 796 (minimum sample size = 319; maximum sample size = 5075).

The full set of results is available in Table 2 and Figure 2. Of the five meta-analysed correlations with academic achievement, four were larger than 0.10, with significant effects ($p < 0.01$) ranging between 0.10 (i.e., Cooperation) and 0.24 (i.e., Self-management).

The *Q* test for heterogeneity shows that there is significant heterogeneity across studies, with the standard deviation of the effects ranging between 0.06 and 0.11.

Figure 2

Meta-analytical associations between the five SEB domains and academic achievement.

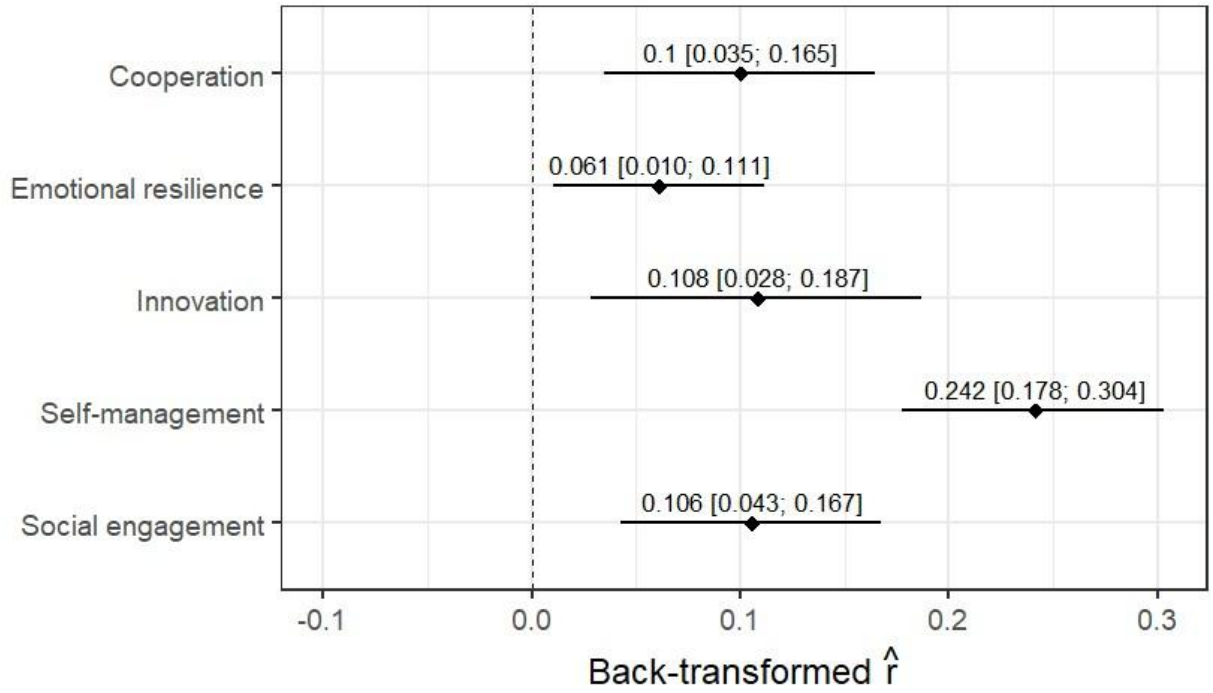


Table 2

Meta-analytical associations between SEB skills and academic achievement

Skill	N (k)	r	CI	PI	se	q	tau2
Cooperation	12672 (10)	0.10**	0.03; 0.17	-0.10; 0.29	0.03	48 (9)*	0.01
Emotional resilience	12672 (10)	0.06*	0.01; 0.11	-0.08; 0.20	0.02	24 (9)*	0.00
Innovation	12672 (10)	0.11*	0.03; 0.19	-0.14; 0.35	0.04	86 (9)*	0.01
Self-management	12672 (10)	0.24***	0.18; 0.30	0.04; 0.42	0.03	59 (9)*	0.01
Social engagement	12672 (10)	0.11**	0.04; 0.17	-0.08; 0.29	0.03	38 (9)*	0.01

Note. * $p < .05$; ** $p < .01$; *** $p < .001$; N = total sample size across the studies; k = number of studies included; CI = Confidence intervals; PI = Prediction intervals; se = Standard error.

These results suggest that, with the exception of Emotional resilience skills, each SEB skill might be considered as a positive correlate of academic achievement, though most effects are small in magnitude. Indeed, only Self-management skills show correlations larger than 0.20 with academic achievement.

Meta-analytic Structural Equation Modeling

To illustrate the use of meta-analytic structural equation modeling within the *Living SEB Skills Project*, we tested whether each SEB skill predicted academic achievement beyond their corresponding Big Five traits and other SEB skills. First, using the first stage of the two-staged structural equation modelling (TSSEM) procedure, we synthesized the bivariate correlations among all variables using a random-effects model. This yields a pooled meta-analytic correlation

matrix of each pairwise association between all the Big Five traits, the five SEB domains, and academic achievement that accounts for sampling error and between-study heterogeneity (Cheung, 2015).

Next, we applied one-stage meta-analytic structural equation modelling (OSMASEM) (Jak & Cheung, 2020). OSMASEM estimates the structural model in a single step by fitting a structural equation model directly to the meta-analytic covariance structure while simultaneously modeling sampling variance and between-study heterogeneity. This approach allows regression paths to be estimated within an SEM framework using the full pooled covariance matrix. Using OSMASEM, we estimated five saturated regression models, each including one SEB domain and its matched Big Five trait as predictors of academic achievement. Additionally, a multiple regression model was estimated including all five SEB domains as predictors of academic achievement.

The *metaSEM* (Cheung, 2024) and *lavaan* (Rosseel, 2012) R packages were used for these analyses and the open code of the webMASEM app (Jak et al., 2021) was used to guide coding of the *Living SEB App* section for MASEM.

MASEM analyses were based on varying number of effect sizes per pairwise correlation (i.e., different correlation matrices), with the minimum available effects per correlation being 3 and the maximum being 23. As a consequence, also sample sizes and precision differed, with the minimum being 2712 (i.e., correlations between personality traits and academic achievement) and the maximum being 22592 (i.e., correlations between SEB domains). Correlation matrices were taken from 24 samples included in 17 different studies.

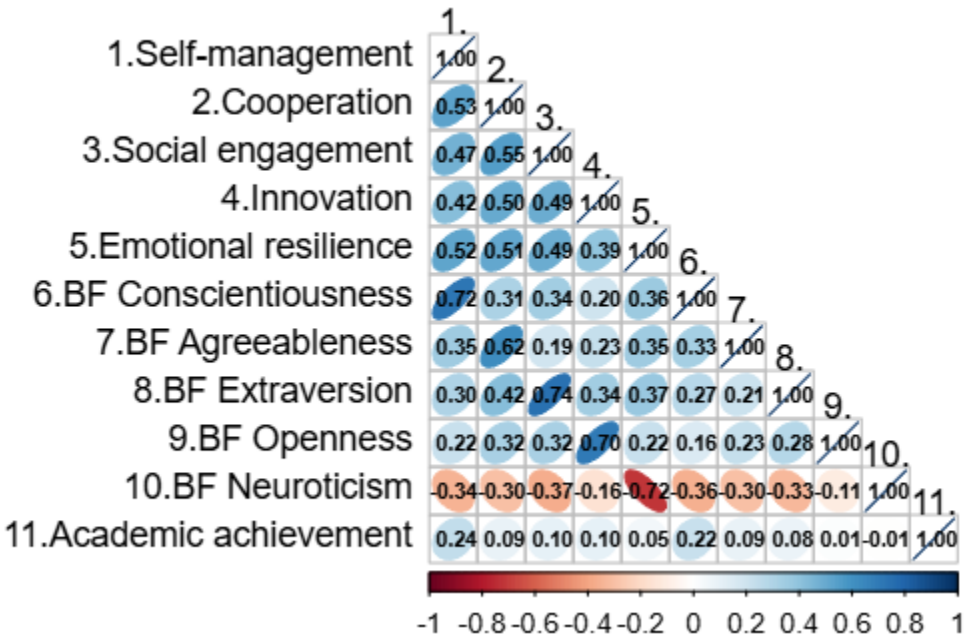
Given the low number of studies available for some variables, we set between-study variance to zero and estimated a common effect across studies. This approach avoids attempting

to estimate random-effects components that would be unstable or poorly identified in sparse conditions.

Pooled correlations

The pooled correlation matrix is reported in Figure 3. As clear from the diagonal cells linking each skill to the corresponding trait, their correlation is substantial ($r > 0.62$), with the highest correlation reaching 0.74. For what concerns academic achievement, Self-management (r = 0.24), BF Conscientiousness (r = 0.22) were the only variables among SEB skills and Big Five traits showing a pooled correlation higher than $r > 0.2$ with academic achievement.Figure 3

Pooled correlation matrix presenting the meta-analytically combined correlations among the study variables across all included samples.



Incremental Validity Beyond the Big Five

From Table 3, three of the SEB skills and one of the personality traits showed significant associations ($p < 0.01$) larger than |0.1| with academic achievement beyond the corresponding trait/skill. Specifically, Innovation ($\hat{\beta} = 0.16$; 95% CI [0.12; 0.20]; $p < 0.001$), Self-management ($\hat{\beta} = 0.17$; 95% CI [0.13; 0.21]; $p < 0.001$), Social engagement ($\hat{\beta} = 0.12$; 95% CI [0.07; 0.16]; $p < 0.001$), and BF Conscientiousness ($\hat{\beta} = 0.13$; 95% CI [0.08; 0.18]; $p < 0.001$) showed significant and practically meaningful associations with academic achievement, while all other associations were lower than |0.08| and non-significant. It should be noted, however, that to estimate a complete OSMASEM model, a more refined analysis would require enlarging the research to all studies testing the association between the Big Five and academic achievement to produce better estimates of the covariance between the Big Five themselves and academic achievement and possibly obtain more precise estimates and lower convergence issues.

These results confirm that SEB skills, as measured by the BESSI questionnaires, differ from the Big Five in terms of predictive validity, with Innovation, Self-management, and Social engagement having higher predictive power than Openness, Conscientiousness, and Extraversion.

Table 3

OSMASEM regression and correlation coefficients for the five models

Outcome		Predictor	Estimate	se	CI	z
Academic achievement	~	BF Openness	-0.065*	0.02	[-0.11; -0.02]	-2.55

Outcome		Predictor	Estimate	se	CI	z
Academic achievement	~	Innovation	0.16***	0.02	[0.12; 0.2]	8.40
BF Openness	~~	Innovation	0.673***	0.01	[0.66; 0.69]	109.86
Academic achievement	~	BF Conscientiousness	0.127***	0.03	[0.08; 0.18]	4.92
Academic achievement	~	Self-management	0.172***	0.02	[0.13; 0.21]	8.67
Self-management	~~	BF Conscientiousness	0.693***	0.01	[0.68; 0.7]	118.26
Academic achievement	~	BF Extraversion	-0.02	0.03	[-0.07; 0.03]	-0.71
Academic achievement	~	Social engagement	0.115***	0.02	[0.07; 0.16]	5.34
Social engagement	~~	BF Extraversion	0.719***	0.00	[0.71; 0.73]	133.70
Academic achievement	~	BF Agreeableness	0.067**	0.02	[0.02; 0.11]	2.82
Academic achievement	~	Cooperation	0.051**	0.02	[0.02; 0.08]	3.08
Cooperation	~~	BF Agreeableness	0.594***	0.01	[0.58; 0.61]	82.27
Academic achievement	~	BF Neuroticism	0.055*	0.03	[0; 0.11]	2.10
Academic achievement	~	Emotional resilience	0.083***	0.02	[0.04; 0.12]	4.14
BF Neuroticism	~~	Emotional resilience	-0.684***	0.01	[-0.7; -0.67]	-115.35

Note. ~ = regression path; ~~ correlation; * $p < .05$; ** $p < .01$; *** $p < .001$; CI = Confidence intervals; se = Standard error.

Incremental Validity Between SEB Skills

Results of the last multiple regression model (see Table 4) show that two of the SEB skills have significant associations ($p < 0.01$) larger than |0.1| with academic achievement beyond the other skill domains. Specifically, Emotional resilience ($\hat{\beta}$ = -0.11; 95% CI [-0.13; -0.09]; $p < 0.001$) and Self-management ($\hat{\beta}$ = 0.24; 95% CI [0.22; 0.25]; $p < 0.001$) showed

significant and practically meaningful associations with academic achievement, while all other associations were lower than |0.06| and/or non-significant.

These results confirm Self-management as the most predictive skill for academic achievement. However, the results also show a small but negative effect of Emotional resilience skills, potentially due to multicollinearity or suppression effects.

Table 4

OSMASEM regression coefficients for the multiple regression model including all five skill domains

Outcome		Predictor	Estimate	se	CI	z
Academic achievement	~	Cooperation	-0.055***	0.01	[-0.07; -0.04]	-6.41
Academic achievement	~	Emotional resilience	-0.11***	0.01	[-0.13; -0.09]	-12.89
Academic achievement	~	Innovation	0.015	0.01	[0; 0.03]	1.75
Academic achievement	~	Self-management	0.238***	0.01	[0.22; 0.25]	28.88
Academic achievement	~	Social engagement	-0.013	0.01	[-0.03; 0]	-1.57

Note. ~ = regression path; ~~ correlation; * $p < .05$; ** $p < .01$; *** $p < .001$; CI = Confidence intervals; se = Standard error.

Reproducibility via the Living SEB App

All analyses can be reproduced in the Meta-analysis and MetaSEM modules of the *Living SEB App*. Users can select specific subsets of studies, download data and R code, and generate updated reports. In line with this idea, an updated report of these analyses is published monthly at https://feracotommaso.github.io/living_SEB_review/paper/livingSEBresults.html as part of the project.

Discussion

In this article, we introduced the *Living SEB Skills Project* and the associated *Living SEB App*, a shiny app for searching and analysing SEB skills data and papers. Three meta-analyses were also conducted to exemplify the use that can be done of the data collected in the *Living SEB Skills Project* and the *Living SEB Skills App* and test theoretically relevant meta-analytical associations between SEB skills and academic achievement and their incremental validity beyond personality traits and between SEB skills. To do this, we ran the most comprehensive analysis to date of the predictive power of SEB skills for academic achievement employing the two main meta-analysis functions currently available in the *Living SEB Skills App*, namely three-level meta-analysis of correlation coefficients and MASEM. The results of these analyses showed that the five skills were significantly associated with academic achievement, with pooled correlations ranging between 0.07 (i.e., Emotional resilience) and 0.24 (i.e., Self-management). When controlling for personality traits in OSMASEM regression models, three of the SEB skills and of the personality traits showed significant association with academic achievement larger than |0.1| beyond the corresponding trait/skill. This result confirms that both frameworks provide unique incremental validity beyond the other and that we should probably not treat SEB skills and the Big Five as interchangeable constructs. Finally, focusing on SEB skills only, our third analysis shows that Self-management skills are key contributors for academic achievement beyond all other skill domains, highlighting again the differential predictive validity of individual skill domains.

As exemplified in these analyses, the *Living SEB Skills Project* provides the necessary tools and data for responding cross-sectional research questions and synthesizing the available

evidence using meta-analysis. However, different uses can be made of this data and of the *Living SEB App*.

Use and Utility the Open Data and the *Living SEB App*

First of all, the *Living SEB Project* materials and the app can be used to synthesize the literature based on the SEB skills framework using meta-analytic procedures and speeding up literature search with useful tools to find all the SEB skills papers covering a specific topic or using/measuring a specific variable. However, considering the limitations detailed below, the results and the reports that can be obtained using the *Living SEB App* should not be considered as publication-ready meta-analysis, which would require additional steps and integration (e.g., risk of bias analysis, tests for publication bias, moderator analysis, tailored modelling approaches). For this reason, we suggest using the *Living SEB App* and the open data available for rapid synthesis only or to inform hypotheses and Bayesian priors for future studies (e.g., the meta-analytical estimates and confidence intervals obtained might be directly used as quantitative priors). Additionally, the reports downloaded from the app (or the data downloaded together with users' R code) could be directly used to support preregistrations and, for instance, uploaded on the Open Science Framework (OSF) or other preferred platforms as evidence for the justification of the effect sizes used in power analyses. On the other hand, reviewers and editors may benefit from this project for their work. Indeed, they can rapidly check whether authors' assertions correspond to up-to-date evidence within the SEB framework, whether the necessary literature has been cited or whether the theoretical introduction and hypotheses are based on the full breadth of evidence or on selected papers. Reports and results obtained from the app could thus be used by reviewers and editors to support their suggestions, without conducting long literature reviews.

Beyond its practical utility, the *Living SEB Skills Project* has broader implications for the theoretical development of SEB skills research and psychology more generally. By maintaining a continuously updated, transparent synthesis of findings, the project helps guard against selective citations, cherry-picking, and conceptual fragmentation that have historically slowed theoretical progress in emerging areas. For SEB research specifically, where competing frameworks and rapid publication rates can easily obscure cumulative patterns, a living evidence base ensures that theories can be tested against the full breadth of available data rather than isolated studies. More broadly, the *Living SEB Skills Project* illustrates how infrastructures of cumulative evidence can shift psychology toward a more dynamic and self-correcting science. Instead of relying on static reviews that quickly become outdated, researchers can build and refine theoretical models with a continually refreshed evidence base. In this sense, the project does not simply provide a database or app but models a new standard for how psychological theory and evidence can co-evolve.

Limitations

When designing the *Living SEB Skills Project* and app, we aimed at finding a good balance between providing enough functionality for the users, while keeping the systematic review process feasible and the application user friendly and intuitive to use. As a consequence, there are many situations in which using the *Living SEB App* only is not the appropriate choice, but more refined analyses should be conducted locally by the researcher. In particular, only cross-sectional data are available. To analyse experimental and longitudinal data, the necessary data must be manually coded (but all the papers needed should already be included in our database). Additionally, the specific measures used are not coded in the data and different measures are automatically meta-analysed as indicators of a specific outcome or construct. For instance, school engagement could be measured with different questionnaires. Authors interested

in moderator analyses should code those specific information. Similarly, study topics are manually and qualitatively defined by the authors and may not correspond to everybody's opinion. We also acknowledge that our reliance on citation-chaining of seminal SEB works may result in missed eligible publications, particularly those that employ BESSI measures without directly citing the validation articles. While this approach ensures feasibility and reduces noise, it might eventually compromise full systematic comprehensiveness. In the long term, we plan to supplement this strategy with periodic keyword-based searches and, where possible, semi-automated text-mining or machine-learning methods to identify overlooked studies. Meanwhile, we actively encourage researchers to notify us of missing contributions so that the database can remain as inclusive as possible. To date, we are not aware of any published studies within the SEB framework that are excluded.

Future Perspectives

Given the current limitations, we suggest a use of the *Living SEB Skills Project* and *App* that respects the boundaries of the functionality offered. However, future updates of the project may enlarge the aims of the project and its uses. In particular, with an increasing number of longitudinal and experimental publications within the SEB framework, the meta-analysis options of the app could be extended to incorporate both possibilities. We also plan to include options for the analysis of moderators and for publication bias. Depending on future funding and resources, it could be possible to automatize the database search and coding procedures through the use of ad-hoc algorithms and artificial intelligence. Moreover, Users may be provided with the possibility to upload additional data in the main database for personal use or openly for the community. Finally, a future extension of the present work could be to integrate the new specific living resources into broader projects (for example, *metaBUS*; Bosco et al., 2020) that could

benefit from well-organized databases focused on specific topics. However, a common framework for labelling and recognizing the different constructs will be necessary to finally integrate the various efforts.

Conclusions

To conclude, the current paper provides the most comprehensive analysis of the predictive power of SEB skills for academic achievement and reports an initial description of the *Living SEB Skills Project.* We hope that researchers, reviewers, editors, and laypeople will use and appreciate the potentialities offered and that our work may facilitate theirs. We also hope that other colleagues will follow our example and build additional platforms covering their specific field of research.

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Supplementary Materials

Table S1.

Initial search string for the two databases.

Search string
Scopus
(REF (taking AND skills AND seriously: AND toward AND an AND integrative AND model AND agenda AND for AND social, AND emotional, AND behavioral AND skills) OR REF (an AND integrative AND framework AND for AND conceptualizing AND assessing AND social, AND emotional, AND behavioral AND skills: AND the AND bessi) OR REF (the AND behavioral, AND emotional, AND social AND skills AND inventory AND psychometric AND properties AND of AND a AND german-language AND adaptation, AND temporal AND stabilities AND of AND the AND skills, AND associations AND with AND personality AND intelligence) OR REF (the AND italian AND behavioral, AND emotional, AND social AND skills AND inventory AND bessi) OR REF (the AND behavioral, AND emotional, AND social AND skills AND inventory: AND a AND spanish AND adaptation AND further AND validation AND in AND adult AND population) OR REF (assessing AND social, AND emotional, AND behavioral AND skills AND in AND just AND a AND few AND minutes: AND 96-, AND 45-, AND 20-item AND short AND forms AND of AND the AND bessi)) AND PUBYEAR > 2019 AND PUBYEAR < 2026

Web Of Science
10.1177/0963721420978613 (Cited DOI) or 10.1037/pspp0000401 (Cited DOI) or 10.3390/jintelligence10030063 (Cited DOI) or 10.1080/00223891.2024.2335912 (Cited DOI) or 10.1177/10731911231225197 (Cited DOI) or 10.1177/10731911241256434 (Cited DOI) |

Table S2.

Updates of the search strings.

Database	String
Scopus	• AND ORIG-LOAD-DATE AFT YYYYMMDD • Title of new measurement/seminal papers added
Web Of Science	• | Timespan: YYYY-MM-DD to YYYY-MM-DD (Index Date) • DOI of new measurement/seminal papers added