

Feeling Appreciated is EA-SI:

Developing, Measuring, and Validating the New Psychological Construct of Experienced
Appreciation in Social Interactions Across Two Different Areas of Human Life

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Danksagung

Da stand er nun. Mit Tränen in den Augen. Tränen der Freude, der Dankbarkeit und des Glücks. Er wusste noch gar nicht so richtig, wie ihm geschah. Aber eines wusste er. Ja, das wusste er ganz genau: Er war dankbar! Dankbar für all die wunderbaren Lebewesen, mit denen er sein Leben teilen durfte und die ihr Leben mit ihm teilten und, ohne die er heute nicht der Mensch wäre, der er sein durfte. Er wollte es in die Welt hinausschreien, himmelhoch jauchzen, vor Freude von den Dächern rufen.

Aber hier und jetzt, in diesem Moment sagte er erst einmal nur ganz leise zu sich selbst:

...

Danke. Ich danke euch allen so sehr!

Zusammenfassung

Das Gefühl wertgeschätzt zu werden wird mit einer Vielzahl an Korrelaten des menschlichen Lebens in Verbindung gebracht. Dennoch ist das psychologische Konstrukt der erfahrenen Wertschätzung in der psychologischen Fachliteratur inkohärent definiert, was in einer uneinheitlichen Operationalisierung und in einer fraglichen Vergleichbarkeit von empirischen Befunden über unterschiedliche Forschungsprojekte hinweg mündet. Zusätzlich hat die Untersuchung der Rolle von erfahrener Wertschätzung auf täglicher Basis in der wissenschaftlichen Literatur bis zum heutigen Tage nur wenig bis keine Beachtung gefunden. Um dieser Forschungslücke entgegenzuwirken und ein konsistentes, evidenz-basiertes Verständnis für das Konstrukt der erfahrenen Wertschätzung zu erzeugen, wurde ein Dissertationsprojekt mit drei empirischen Originalstudien durchgeführt.

In der ersten Originalstudie wurde das integrative psychologische Konstrukt der erfahrenen Wertschätzung in sozialen Interaktionen (EA-SI) im Arbeitskontext definiert, theoretisch verankert, operationalisiert und validiert. Zu diesem Zweck wurde ein Mehr-Studien-Design basierend auf zwei unabhängigen Stichproben und online-gestützten Selbstberichten angewendet. Arbeitnehmende aus unterschiedlichen Branchen wurden als Proband*innen/ Wertschätzungsempfänger*innen zu deren Kolleg*innen und direkten Führungskräften als Wertschätzer*innen befragt. Die explorativen und konfirmatorischen Faktorenanalysen deuteten auf eine eindimensionale Struktur von EA-SI hin. Die Annahmen der Stress-as-Offense-to-Self-Theorie (Semmer et al. 2007), die das theoretische Rahmenmodell für EA-SI bildet, konnten anhand der durchgeführten Pearson Produkt-Moment Korrelationen und der hierarchischen linearen Regressionen validiert gestärkt. Während EA-SI mithilfe der neu entwickelten Instrumente objektiv, reliabel und valide gemessen werden konnte, sagte es die Zufriedenheit, das Wohlbefinden und das Engagement der Proband*innen, über den Einfluss von sozialer Unterstützung hinaus, vorher.

Die zuvor gesammelten Erkenntnisse wurden in der zweiten Originalstudie erneut in einem Mehr-Studien-Design im Arbeitskontext getestet. Auf der Grundlage ähnlicher Proband*innenkonstellationen und statistischer Analysen, konnte EA-SI mithilfe der neu entwickelten Kurzsкала reliabel und valide gemessen werden. Die Ergebnisse legten erneut eine eindimensionale Struktur des Konstruktes nahe. Das theoretische Modell von EA-SI wurde gestärkt, da erfahrene Wertschätzung positiv mit dem Selbstwert und negativ mit dem Stresserleben der Proband*innen zusammenhing. Über den Einfluss von sozialer Unterstützung hinaus, sagte EA-SI das Arbeitsengagement und Burnout der Proband*innen vorher.

Fasst man die ersten beiden Originalstudien zusammen, so zeigte sich das neu entwickelte Konstrukt als eine konsistente, reliable und valide Alternative zur zuvor genannten Inkongruenz, indem es ein tiefgehend ausgearbeitetes und zugleich empirisch getestetes Modell anbietet. Nichtsdestotrotz, war EA-SI bis zu diesem Zeitpunkt weder in anderen Beziehungsarten oder Lebensbereichen getestet noch auf täglichen Basis validiert worden.

Aus diesem Grund wurden das neu entwickelte Konstrukt EA-SI und dessen theoretisches Rahmenmodell in der dritten Originalstudie im Schulkontext getestet. Unter Anwendung eines online-gestützten Tagebuchs über einen Zeitraum von vier aufeinanderfolgenden Schulwochen hinweg, wurden zeitlich verschobene Daten im Rahmen von Multilevel-Analysen mit Tagen (Level 1) genestet in Personen (Level 2) untersucht. Befragte man Schüler*innen der Klassenstufe Fünf bis Neun zu deren Lehrpersonen als Wertschätzer*innen, so zeigt sich die erfahrene Wertschätzung am heutigen Tag als signifikanter Prädiktor für deren intrinsische Motivation, subjektives Wohlbefinden, Selbstwirksamkeit und Schulzufriedenheit am folgenden Tag über den Einfluss von Alter, Geschlecht und Zeit hinaus. Mit der adaptierten Skala in voller und in gekürzter Länge konnte EA-SI auch im Schulkontext reliabel und valide gemessen werden. Die Ergebnisse deuteten erneut auf eine eindimensionale Struktur von EA-SI hin. Die theoretischen Annahmen der

Stress-as-Offense-to-Self-Theory konnten auch für Schüler*innen und über die Begrenzung querschnittlicher Designs hinaus repliziert werden.

Das vorliegende Dissertationsprojekt trägt zu einem konsistenteren, theorie- und evidenz-basierten Verständnis des Konstruktes der erfahrenen Wertschätzung bei. Mit EA-SI ist ein neues psychologisches Konstrukt geschaffen, das eine Vielzahl unterschiedlicher Manifestationen von Wertschätzung in sich vereint. Dieses neue, eindimensionale Konstrukt wird getragen von einem detaillierten theoretischen Modell und kann objektiv, reliabel und valide gemessen werden unter Anwendung eines der vier neu entwickelten Instrumente. Auf der Grundlage der Ergebnisse von vier unabhängigen Stichproben aus zwei unterschiedlichen Lebensbereichen zeigte sich ein signifikanter Zusammenhang zwischen erfahrener Wertschätzung und dem Selbstwert, Stresserleben, Wohlbefinden und der Motivation der Proband*innen auf querschnittlicher (Arbeitskontext; Originalstudien 1 und 2) und auf täglicher Basis (Schulkontext; Originalstudie 3).

Abstract

The experience of feeling appreciated is relevant to a variety of outcomes in human life. However, the psychological construct of experienced appreciation is incoherently defined in psychological literature resulting in inconsistent operationalization and questionable comparability of empirical findings across different research projects. In addition, investigating the relevance of experienced appreciation on a daily basis has received little to no attention in the scientific literature so far. To counter this research gap and to create a consistent, evidence-based understanding of the construct of experienced appreciation, a PhD research project with three original empirical studies was conducted.

In the first original study the integrative psychological construct of experienced appreciation in social interactions (EA-SI) was defined, theoretically anchored, operationalized, and validated in the occupational context. A multi-study design with two independent samples and online-based self-reports was applied. Employees from a multitude of different industries were investigated as participants/ appreciation receivers being asked about their colleagues and direct supervisors as appreciators. Exploratory and confirmatory factor analyses indicated a one-dimensional structure for EA-SI. The assumptions of the Stress-as-Offense-to-Self theory (Semmer et al. 2007) as the theoretical framework for EA-SI were validated based on Pearson product-moment correlations and hierarchical linear regressions. EA-SI could objectively, reliably, and validly be measured using the newly developed instruments while predicting employees' satisfaction, well-being, and engagement above social support.

In the second original study, the previously gained insights were put to the test replicating them in another multi-study design in the occupational context. Based on similar constellations of appreciation receivers and statistical analyses, EA-SI was reliably and validly measured applying the newly developed short scale. Again, the results pointed towards a single-dimensional structure of the construct. Higher experienced appreciation was related to higher self-esteem and lower stress, strengthening the theoretical model of EA-SI. Employees' work

engagement and burnout were predicted by EA-SI beyond the influence of social support.

Summing up the first and second original study, the newly developed construct was strengthened as a consistent, reliable, and valid alternative to the aforementioned incongruence by offering an in-depth elaborated but also empirically tested model. However, neither was EA-SI tested for other types of relationships and areas of life, nor had it been validated on a day-to-day-basis up to this point.

Thus, in the third original study, the newly developed construct of EA-SI and its theoretical framework were tested in the school context. Applying an online-based diary over four consecutive school weeks, time-lagged data was analyzed in multilevel analyses with days (level one) nested in students (level two). When high school students from grade five to nine (appreciation receivers) were asked about their teachers as appreciators, experienced appreciation on the present day significantly predicted their next-day intrinsic motivation, subjective well-being, self-efficacy, and school satisfaction beyond the influence of age, gender, and time. EA-SI was reliably and validly measured with the adapted full-length and short instrument at school. Again, EA-SI was single-dimensional in structure. The theoretical assumptions of the Stress-as-Offense-to-Self theory were valid for high school students and beyond the limitations of cross-sectional designs.

Conclusively, this PhD research project contributes to a more consistent, theory-, and evidence-based understanding of the construct of experienced appreciation. EA-SI represents a new psychological construct that integrates a multitude of different expressions of appreciation. This new, single-dimensional construct is supported by a detailed theoretical model. It can be operationalized in an objective, reliable, and valid way based on the new instruments. Combining the findings from four independent samples and two different areas of life, experienced appreciation was significantly related to participants' self-esteem, perceived stress, satisfaction, well-being, and motivation on a cross-sectional (occupational context; original studies one and two) and daily (school context; original study three) basis.

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List of Original Manuscripts

Resch, M. & Bellhäuser, H. (2025). Appreciation should be EA-SI – Demystifying the definition and operationalization of experienced appreciation at work by developing a new construct. *Frontiers in Psychology*, 16.
<https://doi.org/10.3389/fpsyg.2025.1445533>. ^{1 2 3}

Resch, M., Nagelmann, E. & Bellhäuser, H. (2025). Measuring appreciation made EA-SI – The development of a short scale to measure experienced appreciation in social interactions at work. *Frontiers in Psychology*, 16.
<https://doi.org/10.3389/fpsyg.2025.1465512>. ^{1 2 3}

Resch, M. S., Zmatlik, F., Weinstein, E. R., Bellhäuser, H. (submitted). Student-teacher interactions can be EA-SI – A diary study to investigate the facilitating role of daily appreciation from teachers for high school students' well-being, motivation, satisfaction, and self-efficacy. *Teaching and Teacher Education*. ^{1 2}

Footnotes

¹To ensure consistency within the already published or submitted manuscripts, the original numbering and formatting of headings, figures, tables, references, and appendices will be upheld when presenting them in section 4. The corresponding references and appendices of the manuscripts will be depicted separately after each original manuscript.

²The text body, figures, tables, references, and appendices were formatted in adherence to the journals' guidelines.

³Where already published, the original manuscripts had further been edited by the journals' formatting services.

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1. Introduction

Horace Jackson Brown Jr. once wrote "Don't forget, a person's greatest emotional need is to feel appreciated" (2007, p. 41). Mahatma Gandhi understood appreciation as one of four essential pillars carrying joyous and fulfilled relationships (Gandhi, 2017). These are only two of numerous examples across different contexts and professions that acknowledge the feeling of being appreciated is a resource in human life worth noticing.

Questioning those statements from a scientific viewpoint, empirical findings also support the assumption that feeling appreciated should be of importance across different areas of humans' lives. Not only is the experience of feeling appreciated at work related to participants' work satisfaction (Pfister et al., 2020) and increased serenity at the end of a workday (Stocker et al., 2014) but also to reduced stress, anxiety, and burnout (Teo et al., 2021). The more employees feel appreciated by their supervisors the less likely they are to leave the organization (Apostel et al., 2018). Experiencing less resourceful interactions at work is related to higher emotional exhaustion (Maslach & Leiter, 2017) while feeling appreciated buffers the negative relation between illegitimate tasks and employees' intrinsic motivation (Muntz & Dormann, 2020).

The beneficial role of feeling appreciated by one's counterpart is not limited to the work context. Reaching beyond the confinements of a single life area, feeling appreciated is also important in earlier stages of human development and professionalization. Hence, high school students who feel appreciated by their teachers report higher well-being (Kostenius & Bergmark, 2016) while evaluating their student-teacher relationship to be more positive (Cui, 2022). The student-teacher interaction, significantly influenced by the experience of feeling appreciated by one's teachers (e.g., Aldrup et al., 2018), is associated with higher motivation at school (Lazarides & Schiefele, 2024), increased student well-being (Murray-Harvey, 2010), and higher satisfaction with one's own learning (Nolen, 2003). On the contrary, the feeling of

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being inappropriately treated by one's teachers is associated with (school) burnout and mental health issues (Walberg, 2014).

Combining these findings, appreciation seems to be a resource of essential relevance for human being's motivation, well-being, satisfaction, and health. However, when further screening the scientific literature, several limitations appear when defining and measuring the construct of experienced appreciation.

First, the psychological construct of experienced appreciation is incongruently defined applying ambiguous factorial models. In some research projects the experience of feeling appreciated is understood as one-dimensional (e.g., Carstensen et al., 2021; Jacobshagen et al., 2008; Semmer et al., 2019) while in others it is defined as four- (e.g., Döring-Katerkamp & Rohrmeier, 2016; Zimmerman & Schunk, 2011) or even five-dimensional (White, 2016). Not only is the construct inconsistently defined, oftentimes it is synonymously used and intermingled with other constructs such as respect (van Quaquebeke & Eckloff, 2010), social support (Sundin et al., 2007), reward (Bregenzer et al., 2022), or social recognition (Schneickert et al, 2019). However, this entanglement with other constructs is diametral to the findings by other research projects postulating that appreciation should rather be understood and further investigated as an autonomous construct (e.g., Semmer et al., 2019). This attempt to treat appreciation as an autonomous construct has been strengthened in several studies pointing towards the incremental predictive value of appreciation above supposedly similar variables such as interactional justice (Stocker et al., 2010) or social support (Auer et al., 2024).

Based on the aforementioned inconsistencies, the construct of experienced appreciation is also incongruently operationalized across psychological research. In line with the various definitions, a multitude of instruments has been developed to measure the supposedly identical construct (e.g., Carstensen et al., 2021; Jacobshagen et al., 2008; van Quaquebeke and Eckloff, 2010; White, 2016). Oftentimes the development of the instruments is not described in detail, or their statistical validation remains inexplicit. Since the instruments are based on

fundamentally divergent definitions, it is questionable to what extent the same latent variable is measured and whether the results from different research projects can be compared with each other.

Besides its incongruent definition and its incongruent operationalization with little to no in-depth statistical validation, the psychological construct of appreciation is mostly applied without embedding it in a viable and methodologically valid theoretical framework. Consequently, the supposed underlying mechanisms of action – explaining the assumed relations and the role of experienced appreciation for humans' lives – remain partially nebulous. Even if the construct of appreciation is theoretically integrated, it is oftentimes focused on a specific context (e.g., work) without taking spillover between different areas of life into account (e.g., Liu et al., 2020). Moreover, most studies are limited to cross-sectional designs with little to no studies investigating experienced appreciation on a daily basis (e.g., Stocker et al., 2014).

Consequently, the following research gap can be deduced: Experienced appreciation is either incoherently defined, inconsistently operationalized, applied without being included in an established theoretical framework, or all of the above. There is no in-depth elaborated model defining the construct of experienced appreciation in detail to which the scientific community could coherently refer to. The results from different research projects are limited to specific samples, life areas, or cross-sectional analyses. The comparability of results remains questionable across different studies.

To counter the aforementioned research gap, this PhD project aims to develop and validate the new psychological construct of *Experienced Appreciation in Social Interactions* (EA-SI) providing an unambiguous alternative to congruently define and operationalize the experience of feeling appreciated when interacting with others. The new construct will be supported by the well-established *Stress-as-Offense-to-Self theory* (SOS theory; Semmer et al., 2007), applying, replicating, and extending the basic assumptions of the theory beyond the

confinements of a single sample and context of human life. To do so, this PhD research project is guided by four research questions:

- (RQ1) How can the experience of feeling appreciated by another human being be defined, combining different understandings of appreciation in one integrative construct?
- (RQ2) Can EA-SI be objectively, reliably, and validly measured using a new instrument that is not only easily applicable but also statistically tested?
- (RQ3) Are the theoretical assumptions of the Stress-as-Offense-to-Self theory valid and replicable across multiple samples and contexts of human lives?
- (RQ4) Are the relations assumed by the SOS theory observable beyond the confinements of cross-sectional designs?

To answer these questions, the PhD project is based on three *original empirical studies*, providing unique insights to answer the guiding research questions. The first and second study will investigate the construct within the occupational context, while the third study will test the assumed relations at school, transferring construct and theory to another area of human life. Before presenting the original studies, the newly developed psychological construct of experienced appreciation in social interactions will be defined in detail, theoretical considerations in model construction will be outlined, and the SOS theory will be introduced as the construct's theoretical framework.

2. Experienced Appreciation in Social Interactions – Developing a New Construct

Please note that the new psychological construct will be introduced first to create a shared language and mutual understanding of what is meant by the term of experienced appreciation. Subsequently, the SOS theory will be outlined in detail.

2.1 Different Types and Focal Points of Appreciation

When putting appreciation in the center of attention, it should be noted that there are several essentially different construct definitions in the psychological literature using the same

word to capture different focal points. For example, appreciation can be felt for one's own life and surroundings (Adler, 2002; Fagley, 2016). A manifestation of this understanding of appreciation would be the feeling of joy and gratitude when watching a breathtaking sundown and feeling awe for the moment and the gift of life. Another focal point can be the appreciation that is felt for one's own body. In this case, an expression of appreciation would be the positive evaluation of specific body characteristics in comparison to others (Avalos et al., 2005).

This PhD project focuses on another focal point that should be distinguished from others. When referring to appreciation, this PhD research project's focal point is the experience of feeling appreciated by others based on the social interaction with them (e.g., Semmer et al., 2007; Stocker et al., 2010; Carstensen et al., 2021). An exemplary expression of this kind of appreciation would be the feeling that one's own strengths and characteristics are seen and valued by one's interaction partner.

2.2 Experienced Appreciation in Social Interactions

Based on the aforementioned research gap, this PhD project aims to develop and validate a new psychological construct as an alternative to the described incongruence in defining and measuring experienced appreciation. To not just further facilitate the existing incoherency by developing yet another unrelated definition and operationalization, this PhD project strives to create an integrative construct, combining different understandings and manifestations of appreciation in one definition. Prior to introducing the original empirical studies in detail, the theoretical considerations in developing the new construct will be outlined.

First, a clear name and specific labels must be developed to create a construct that can be consistently addressed in distinction to others. To do so, the construct is named *Experienced Appreciation in Social Interactions*, pointing towards its focus on the sensation of feeling appreciated when socially interacting with others. Moreover, the chosen wording indicates that there have to be (at least) two interaction partners, sharing a social interaction while exchanging specific messages with each other. To provide more clarity when starting the dialogue about

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experienced appreciation, specific labels are created to allow easy differentiation between the involved interacting partners. The person receiving the supposedly appreciative messages will be named the *appreciation receiver* while the one sending potentially appreciative messages will be named the *appreciator*.

When focusing on the interaction between appreciator and appreciation receiver, the assumed interactions are rooted in basic assumptions of communication theory. First, the model acknowledges that specific and supposedly appreciative signals encoded by the appreciator have to be decoded by the appreciation receiver before evaluating whether they feel more or less appreciated (Schulz von Thun et al., 2014). Second, the model recognizes that human beings are constantly communicating with each other, whether it be consciously or unconsciously. It should not be possible to not communicate with each other (Watzlawick et al., 2016). It is important to note that the construct EA-SI puts the experience of the appreciation receiver in the center of attention, not the intention of the appreciator. It is not of relevance whether the appreciator meant to act in an appreciative way but whether the appreciation receiver feels appreciated based on decoding the signals sent via various channels.

Deduced from these prepositions of human communication, social interaction between appreciator and appreciation receiver can take place directly or indirectly, verbally or non-verbally, and privately or publicly (e.g., Adair, 2009). This means that honoring the performance of an employee in front of their colleagues (direct, verbal, public) would as well be a situation facilitating the experience of feeling appreciated as sharing an appreciative, written evaluation with a student (indirect, verbal, private). On the contrary, a skeptical look, looking away, or treating a proposed question with silence in front of one's colleagues or classmates would be a situation facilitating the feeling of not being appreciated even though the appreciator did not speak a single word (direct, non-verbal, public).

After (1) separating the construct from other focal points, (2) providing an explicit nomenclature with specific names and labels, and (3) embedding the construct in a network of

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communicational prerequisites clarifying various channels of human communication, EA-SI will (4) be developed as an inclusive construct by integrating different understandings of experienced appreciation. To do so, a multitude of expressions, actions, and messages that can be understood as potential signals of appreciation were derived from scientific literature. Combining insights from the occupational and the educational context, signals of appreciation can be theoretically differentiated into conditional and unconditional manifestations of appreciation. The definition of EA-SI will be developed as a combination of explicit, identifiable expressions of experienced appreciation to which interaction partners can directly refer to rather than providing an abstract description of the latent variable which would have to be further translated to be of practical use.

Feeling conditionally appreciated means feeling seen and valued in one's opinion (e.g., Yukl et al., 2002) and acknowledged for one's strengths, competencies, and knowledge (e.g., Stocker et al., 2014). It means that the appreciation receiver feels trusted (e.g., Elfering et al., 2007), valued (e.g., Kuoppala et al., 2008), materially and non-materially recognized (e.g., White, 2016), and respected for one's work (e.g., Apostel et al., 2018). When based on their actions and/ or performance, conditional appreciation can manifest in opportunities to grow and develop (e.g., Siegrist, 2016), or in the perceived willingness of the appreciator to invest time and resources for the appreciation receiver's benefit (e.g., Semmer et al., 2019).

Feeling unconditionally appreciated means that the appreciation receiver feels seen and valued as a human being. Manifestations of unconditional appreciation are not bound to any prerequisites but an expression of the underlying benevolence of the appreciator (e.g., Mettler von Meibom, 2007), cherishing the appreciation receiver's personality, traits, and existence. Unconditional appreciation means feeling accepted (e.g., Eckert et al., 2025), respected, and treated in an appropriate (e.g., Apostel et al., 2018; Walburg, 2014), non-violent way (Rosenberg, 2015) as a human being. Implementing basic considerations of the client-centered approach by Rogers (1991), unconditional appreciation means feeling the appreciator's

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authentic interest in what they have to say on a professional and personal level while getting the chance to emotionally and socially bond with them. The opportunity to professionally develop (Siegrist, 2016) and the feeling that the appreciator is willing to invest time and resources for the sake of one's own benefit (Semmer et al., 2019) can not only be an expression of conditional, but also of unconditional appreciation. This is the case when the appreciation receiver has the feeling that these manifestations are not bound to a specific action or performance but based on the general willingness of the appreciator to facilitate their growth and development free from any requirements. Furthermore, EA-SI integrates the feeling of being a valued part of the work/ class community in contrast to feeling excluded (e.g., Ferris et al., 2008).

In own words, feeling conditionally appreciated could be synthesized in the sentence: I feel seen in my strengths, achievements, and contributions, sensing the willingness of the appreciator to recognize them and facilitate my development based my actions. The feeling of unconditional appreciation could be summed up in the sentence: I feel seen and heard as a human being while my worth is recognized as untouchable, no matter the circumstances.

Following the insights by Döring-Katerkamp and Rohrmeier (2016), conditional appreciation is more present in the occupational context, although employees evaluate the sensation of unconditional appreciation to be more desirable. EA-SI acknowledges the value of unconditional (oftentimes overlooked) and conditional signals of appreciation by integrating them both. However, conditional and unconditional manifestations of appreciation are oftentimes entangled with each other. Sometimes, the same manifestation can be a signal of conditional or unconditional appreciation depending on the attributed intention. Therefore, throughout the course of this PhD research project, it will be questioned and discussed whether the psychological construct of EA-SI should be segmented into different, statistically distinguishable dimensions or rather be understood as a single-dimensional construct.

After developing EA-SI as an integrative construct, in the next step the autonomous understanding of experienced appreciation has to be anchored in a viable theoretical foundation to which researchers and practitioners can consistently refer to. Consequently, basic theoretical considerations and the Stress-as-Offense-to-Self theory (Semmer et al. 2007) will be outlined in the next section.

3. Theoretical Integration of EA-SI

3.1 Initial Theoretical Considerations

When deciding on how to theoretically integrate EA-SI, Merton's (1968) considerations on theoretical depth are incorporated. In accordance with the idea that theories can be distinguished by depth (Merton, 1968), the three levels of applied, middle-range, and grand theory are applied.

Grand theory aims to explain "[...] the uniformities of human behavior [...] refer[ring] to logically interconnected sets of prepositions from which empirical uniformities can be derived" (Merton, 1968, p. 39). Hence, by incorporating the aforementioned assumptions on human communication by Schulz von Thun et al. (2014) and Watzlawick et al. (2016) into the development of EA-SI, grand theory is considered. These axioms of human communication have been implemented to contribute to a deeper understanding of the construct and its basic considerations regarding the interaction between appreciation receiver and appreciator.

Middle-range theory aims to explain human interaction on a more fine-grained, less axiomatic, but still abstract level (Merton, 1968). The SOS theory (Semmer et al., 2007) will be integrated as the theoretical framework of EA-SI. According to Semmer et al. (2025), the SOS theory is a theoretical framework still under construction consistently extending its nomological network. The *nomological network* describes the set of premises and laws building the substance of a theory while explaining the expected relations between the investigated latent variables and observable phenomena (Cronbach & Meehl, 1955; Schmidt-Atzert et al., 2021).

Extending the theory by EA-SI as an autonomous construct understanding of experienced appreciation, this PhD project strives to further enhance the nomological network of the theory.

The most fine-grained level of *applied theory* should be hypothesis-based while demanding theoretical insights to be of practical value (e.g. Lewin, 1945). The level of applied theoretical depth is considered by translating the integrative construct of EA-SI and the theoretical considerations of the SOS theory into an explicit theoretical model. This model will describe the expected relations between specific constructs in detail while also being tested empirically. Guided by scientific research questions and hypotheses, the dimensionality, reliability, validity, and practical relevance of EA-SI will be put to the test across all three original studies. Providing insights for researchers and practitioners on the most applied level, the constructed model aims to bridge theoretical considerations and practical applicability.

Hence, the terms of theory and model will be used in distinction to each other. A *theory* is understood as the network of premises explaining a phenomenon and expected relations on a rather abstract level. A *model* integrates various (grand) theoretical considerations and (middle-range theoretical) premises, applying them to explain the explicit relations between specific outcomes (Schlottke, 2021).

In the following section the SOS theory (Semmer et al., 2007) will be introduced. Please note that the theory originates from the context of organizational psychology which is why it will be explained with strong emphasis on the occupational context. However, the theoretical considerations on why the theory will also be transferred to and tested in the context of high school will be elaborated in detail when introducing the third original study (section 4.5).

3.2 The Stress-as-Offense-to-Self Theory – The Human Self-Esteem as a Basic Need

Referring to the SOS theory, establishing and securing a positive self-esteem represents a deeply rooted human need. To maintain and develop a positive self-esteem is supposed to be one of the most important endeavors of human existence (Semmer et al., 2007). Following this line of thought, the endangerment of an individual's self-esteem should result in the need to

counteract the attack, defend one's self-esteem, and cope with the offense. Ultimately, the need to defend against and react to an attack to one's self-esteem facilitates the sensation of stress (Semmer et al., 2019). Summed up, the SOS theory postulates that human beings long for a positive self-esteem which they are willing to defend against an offense even at the costs of feeling stress in return.

3.3 Introducing Boosts and Threats to the Self-Esteem

When further reflecting on the basic assumptions of the SOS theory, the question that inevitably arises is whether there are influential factors systematically facilitating or endangering the individual's self-esteem. Semmer et al. (2019) defined such influences as boosts or threats. When confronted with a *boost* (e.g., appreciation), the human's self-esteem should be strengthened, there should be no need to defend against an offense, and the sensation of stress should be lower. On the contrary, when confronted with a specific *threat* (e.g., being asked to carry out illegitimate tasks not rightfully part of one's role description), the individual should be forced to defend their self-esteem and the underlying need against the potential offense, accompanied by higher levels of stress (Muntz & Dormann, 2020).

3.4 SOS Theory and Possible Outcomes – Consequences of (Not) Feeling Appreciated

Finally, feeling more or less stressed should be associated with various outcomes (Semmer et al., 2007). For example, employees who experience more stress report higher emotional exhaustion (Teo et al., 2021), reduced work satisfaction (Al-Aali and Ahmed, 2022), and increased sleep disturbances (Fahlén et al., 2006). Chronic exposure to stress is associated with increased cardiovascular risks (Marmot et al., 2002).

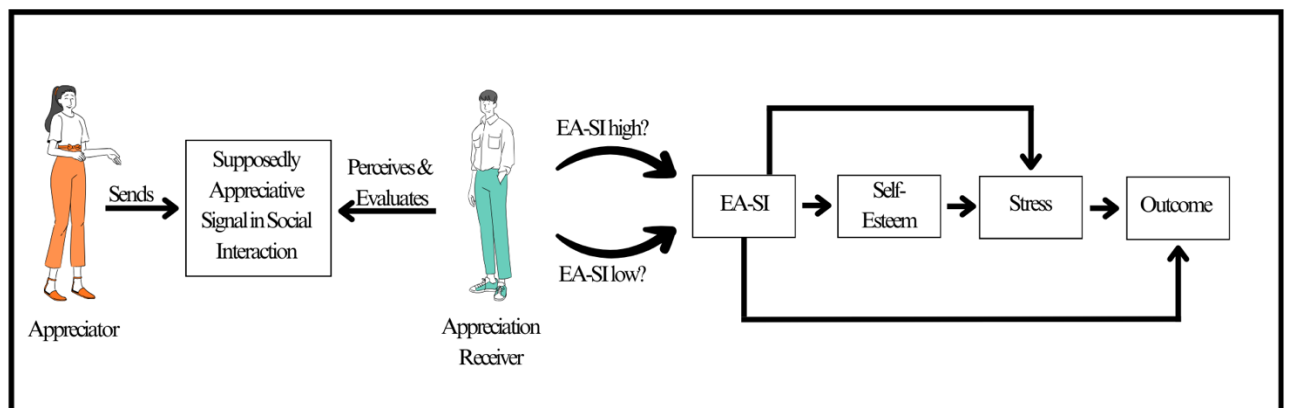
Moreover, direct relations between stress and boosts/ threats and between boosts/ threats and various outcomes can be deduced from the SOS theory (Semmer et al., 2007). For example, carrying out illegitimate tasks at work relates to less feelings of success when completing a specific task (Semmer et al., 2025). In contrast, feeling appreciated at work is directly associated with higher job satisfaction (Stocker et al., 2010) and reduced turnover intentions

(Apostel et al., 2018). Resourceful interactions at work are related to lower emotional exhaustion and burnout (Maslach & Leiter, 2017). Male employees who feel appreciated at work show a reduced risk for coronary heart disease (e.g., Auer et al., 2024).

Consequently, EA-SI will be tested as a boost applying the theoretical premises of the SOS theory. A detailed explanation of why to build EA-SI upon the theoretical framework of the SOS theory in relation to other established theories (e.g. JD-R, Bakker & Demerouti, 2014; COR, Hobfoll et al., 2016) will follow in the original study one. Figure 1 outlines the EA-SI model and the expected relations. The explicit research hypotheses will be presented in the original empirical studies.

Figure 1

Depiction of the EA-SI Model Based on Theoretical Considerations and the SOS Theory



4. Presenting the Original Empirical Studies

To answer the defined research questions and to counter the aforementioned research gap, this PhD project is based on three original empirical studies. In the following sections, these original studies will be presented stepwise while clarifying their unique contribution to the research project.

4.1 Research Objective – Original Empirical Study One

In the first step, EA-SI and its theoretical framework will be tested in the occupational context, as one of the most important identity-shaping areas of human life (Ashforth & Schinoff, 2016). Employees will be investigated as appreciation receivers whilst their

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colleagues and direct supervisors will stand in the center of attention as appreciators. The first original study strives to (1) further develop EA-SI as a new psychological construct that integrates different understandings of appreciation across scientific literature. Based on psychometric considerations, (2) an operationalization of EA-SI will be created. Subsequently, (3) the construct's dimensional structure will be clarified and (4) the new instrument will be statistically validated while (5) testing the assumptions of the SOS theory. Taking potential spillover between different life areas into account, EA-SI will (6) be theoretically and statistically differentiated from the psychological construct of social support. The first original study will be guided by six research questions:

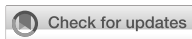
- Q1:** How can the different understandings of appreciation be combined in one integrative construct definition that values conditional and unconditional aspects?
- Q2:** What is the factor structure of this new construct?
- Q3:** Can experienced appreciation be reliably and validly measured using the new construct?
- Q4:** Is experienced appreciation solely associated with work-related measures, or are there spillover effects on other aspects of employees' lives?
- Q5:** Are the expected relations replicable in branch-heterogeneous samples across different professions?
- Q6:** Is appreciation theoretically and statistically distinguishable from social support?

To answer these research questions, a multi-study design will be applied. Hence, the term *study* will be used to refer to the different samples within the original (empirical) studies. In the first study, the new instrument will be developed exploring its dimensional structure based on a cross-sectional design. In the second study, the instrument and expected factor structure will then be tested in a longitudinal design with two time points of data collection. The data will be collected using online-based self-reports. Both studies are characterized by heterogeneous participant compositions from a multitude of different industries, aiming for

high generalizability of the results. To develop a statistically validated instrument, the EA-SI Work Scale will be created based on established psychometric considerations (Bortz & Döring, 2006; Moosbrugger & Kelava, 2008; Pospeschill, 2013). In the first study, the dimensional structure of the psychological construct will be explored using exploratory factor analysis based on the maximum likelihood method with varimax rotation, complemented by scree plots and parallel analyses (O'Connor, 2000). In the second study, the factorial structure of EA-SI will then be tested computing confirmatory factor analysis supplemented by additional fit indices (Hu & Bentler, 1999). The theoretical assumptions of the SOS theory are statistically tested with Pearson product-moment correlations (e.g., Kurtz & Mayo, 1978) and hierarchical linear regressions (e.g., Montgomery et al., 2021), controlled for social support. Since all analyses are based on self-reported data, tests on common method bias will be included (e.g., Fuller et al., 2016; Lindell & Whitney, 2001).

4.2 Original Empirical Study One

Resch, M. & Bellhäuser, H. (2025). Appreciation should be EA-SI – Demystifying the definition and operationalization of experienced appreciation at work by developing a new construct. *Frontiers in Psychology, 16*.
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Appreciation should be EA-SI—demystifying the definition and operationalization of experienced appreciation at work by developing a new construct

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In this article, we developed the new construct, Experienced Appreciation in Social Interactions (EA-SI), to reduce the inconsistency in defining and measuring experienced appreciation at work. The integrative theoretical model is based on the well-validated *Stress as Offense to Self*-theory. To operationalize the construct, we validated the EA-SI Work Scale in two independent German samples of employees. Colleagues and supervisors were investigated as potential sources of experienced appreciation. Study One included $N = 231$ participants. Study Two encompassed $N = 391$. In both studies, we applied a cross-sectional field-study design based on self-reported surveys. Using exploratory and confirmatory factor analyses, the construct EA-SI turned out to be unidimensional. The Pearson product-moment correlations showed that the more employees felt appreciated, the higher their self-esteem and the lower their stress perception. The premises of the theoretical foundation were replicable. Higher experienced appreciation was related to more work satisfaction, life satisfaction, and work engagement, as well as lower emotional exhaustion. These relations were true for both groups of appreciators. When tested in hierarchical regressions, EA-SI added incremental prediction beyond the influence of social support in most of the analyses. The instrument's internal consistency and retest reliability were good to excellent. The results indicated the EA-SI Work Scale to be content, construct, and criterion valid. Based on these findings, the strengths and limitations of the article and possible implications for future research and practical use are discussed.

KEYWORDS

EA-SI, EA-SI work scale, stress as offense to self, occupational health, wellbeing

1 Introduction

Relationships should be based on the four principles: respect, understanding, acceptance, and appreciation to foster joy, fulfillment, and harmony in our everyday interactions. At least, that is what Arun Gandhi postulated about non-violent social interaction (Gandhi, 2017). In line with Gandhi's evaluation, occupational health psychology—acknowledging the work context as one of the most important origins of individuals' identity and self-esteem (Ashforth and Schinoff, 2016)—also focuses on investigating appreciation.

Feeling appreciated at work relates to increased motivation and satisfaction (Kottwitz et al., 2019; Stocker et al., 2010), higher serenity at the end of the workday (Stocker et al., 2014), reduced stress and anxiety (Teo et al., 2021), and increased positive affect toward the organization (Pfister et al., 2020). Appreciation buffers the negative relation between

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interruptions at work and wellbeing (Stocker et al., 2019) and is associated with reduced turnover intention (Apostel et al., 2018) and burnout (Teo et al., 2021).

Despite its importance, appreciation seems to be a resource of limited availability. On average, employees reported less than one single appreciative interaction a day (Stocker et al., 2014). Moreover, the construct “appreciation” is inconsistently defined and operationalized in scientific literature. For research to move forward effectively and for practical use—such as enabling employees and supervisors to foster appreciative experiences purposefully—the construct should be defined in a congruent, unambiguous way to attain comparable scientific findings.

In contrast, research often entangles appreciation with other constructs such as social support (Sundin et al., 2007), reward (Bregenzer et al., 2022), gratitude (Tang et al., 2021), respect (van Quaquebeke and Eckloff, 2010), or social recognition (Schneickert et al., 2019). In distinction from this approach, Semmer et al. (2019) understand appreciation as a unique construct that should not be synonymously entangled with other constructs.

Even when defined as an autonomous construct, there is no consensus regarding the theoretical definition and framework of appreciation. Most definitions focus solely on conditional appreciation. Unconditional expressions of appreciation—such as valuing one another as human beings regardless of performance or achievements—are oftentimes not integrated explicitly. In line with the incongruency in defining appreciation, its assumed factor structure varies from five-factorial (White, 2016) over four-factorial (Döring-Katerkamp and Rohrmeier, 2016) to single-factor solutions (Bakker et al., 2007; Carstensen et al., 2021; Semmer et al., 2019).

Please note that for a more detailed illustration of different understandings and operationalizations of appreciation, Resch et al. (2025) could be consulted. Given the described research gap and following the findings by Semmer et al. (2019), pointing toward appreciation as an autonomous construct, the current article aims to answer the following research questions:

Q1: How can the different understandings of appreciation be combined in one integrative construct definition that values conditional and unconditional aspects?

Q2: What is the factor structure of this new construct?

Q3: Can experienced appreciation be reliably and validly measured using the new construct?

Previous studies have reported significant relations between appreciation and employees’ wellbeing, satisfaction, and motivation. However, some of these studies were based on samples with little heterogeneity, challenging the generalizability of the results. For example, the data was limited to students (Carstensen et al., 2021), nurses (Muntz and Dormann, 2020), or soldiers (Stocker et al., 2010) only. In addition, most articles solely considered work-related outcomes, while potential spillover effects from work to other contexts of employee life (Liu et al., 2020) were ignored. Hence, we propose a fourth and fifth question:

Q4: Is experienced appreciation solely associated with work-related measures, or are there spillover effects on other aspects of employees’ lives?

Q5: Are the expected relations replicable in branch-heterogeneous samples across different professions?

Finally, it should not be neglected that there are intersections between the constructs “social support” and “appreciation” (Kurtessis et al., 2017). To test the assumption by Semmer et al. (2019) that appreciation is a construct that predicts employees’ wellbeing above social support rather than being a facet of the same, we propose a sixth research question:

Q6: Is appreciation theoretically and statistically distinguishable from social support?

Following these research questions, this article aims to develop and validate a new construct—Experienced Appreciation in Social Interactions (EA-SI)—that combines different understandings of appreciation in one integrative model. To do so, we theoretically derived the construct from literature and subsequently investigated it in a multi-study field design with two branch-heterogeneous samples across Germany. In both studies, we focused on colleagues and supervisors as possible origins of appreciation (e.g., Stocker et al., 2014).

To counter the incoherence in defining and measuring appreciation at work, in the following article, we will (1) derive a new construct based on different understandings of appreciation and (2) unravel the Stress as Offense to Self-theory (SOS; Semmer et al., 2019) as the theoretical foundation of EA-SI. We will then (3) develop the EA-SI Work Scale to operationalize this new construct. In Study One, we will (4) statistically revise the instrument, and (5) exploratively investigate the factor structure of EA-SI, as well as (6) test the reliability and criterion validity of the EA-SI Work Scale.

In Study Two, we will (9) test the assumed factor structure of EA-SI and (10) replicate the theoretical premises of the SOS theory in an independent sample. We will (11) test for convergent and discriminant construct validity and (12) investigate the incremental validity of EA-SI in predicting employee wellbeing, engagement, and satisfaction above social support. Finally, the findings of both studies, their strengths and limitations, and implications for research and organizations will be discussed. Please note that the findings and implications of the current article inspired the development of a short scale to measure EA-SI, extending the understanding and validation of the construct (Resch et al., 2025).

2 Theoretical framework

2.1 Theoretical considerations in deriving EA-SI

Referring to Merton (1968), implying that theoretical frameworks should be distinguished regarding different levels of scope and depth, we derived EA-SI considering not solely grand theory but also “middle-range theory,” and applied theory. Grand theory should strive to explain “the uniformities of human behavior [...] refer[ring] to logically interconnected sets of propositions from which empirical uniformities can be derived” (Merton, 1968, p. 39). On this overarching level, EA-SI acknowledges the grand theoretical belief that human beings are social entities, sharing the uniform need to (socially) connect to each other (Baumeister and

Leary, 2017). Following this need to connect, human beings must communicate with each other, whether actively intending to do so or not (Watzlawick et al., 2016). This ongoing communication involves either understanding or misunderstanding, depending on the encoding and decoding process of messages sent and received (Schulz von Thun et al., 2014). Coherently, these interactions can be characterized by the experience of feeling more or less appreciated. These theoretical considerations are understood as basic axioms of human interaction on the most generic level and are not further tested in this article.

On the level of “middle-range theory”—explaining specific phenomena on a more small-scaled level (Merton, 1968)—EA-SI is based on the assumption that interpersonal interactions should be characterized by an appreciative and benevolent attitude toward each other, in order to maintain and protect a positive self-esteem. Hence, we built EA-SI upon the SOS theory, putting the human self-esteem and its relation to appreciation in the center of the theoretical framework. The SOS theory will be outlined in detail in Section 2.3 and tested statistically in both studies.

Since there are several mutually inconsistent understandings of appreciation on the level of applied theory—offering the most small-scaled, hypotheses-based theoretical considerations benefitting practical application—we decided to counter this incongruency by defining EA-SI as an integrative construct that combines a variety of different signals and/or actions that are believed to foster the feeling of being appreciated. This is why the construct’s definition is circulating around a diversified list of explicit manifestations of appreciation rather than equating a definition on a more generic level. In coherence with the described theoretical incongruency, we did not propose the expectation of a specific factorial structure but investigated the dimensionality of EA-SI exploratively in Study One before replicating it in Study Two.

2.2 Defining experienced appreciation in social interactions

Following the word appreciation to its linguistic roots, the Latin word “*appretiare*” (OED Online, 2013) means rating something or someone. In a more contemporary sense, the verb “to appreciate” means to see, cheer, and acknowledge someone’s value (Schäfer, 2021).

When examining how the scientific literature addresses appreciation, it is apparent that there are many constructs associated with the same word. Appreciation could describe the awe and wonder one feels when thinking about oneself and one’s life (Adler, 2002; Fagley, 2016), as well as the positive acknowledgment of one’s own body (Avalos et al., 2005) or the positive evaluation one receives from others (Pfister et al., 2020; Semmer et al., 2019; Stocker et al., 2010).

This article focuses on the appreciation experienced when interacting with others. EA-SI differentiates between the person who feels appreciated (*appreciation receiver*) and the one who sends appreciative signals (*appreciator*). Since the model integrates fundamental theoretical considerations regarding interpersonal communication (Schulz von Thun et al., 2014; Watzlawick et al.,

2016), how the receiver decodes and interprets a sent signal should substantially determine whether or not they feel appreciated. Hence, EA-SI focuses primarily on the receiver’s perception and sensations rather than the appreciator’s intentions.

The appreciation receiver can experience appreciation directly and verbally by the appreciator as well as indirectly and non-verbally (Stocker et al., 2014). Such interactions can occur publicly in front of others or in more private one-on-one settings (Adair, 2009). For example, finding a small note with the words “Thank you!” written on it (indirect/verbal/one-on-one) is also a manifestation of EA-SI as hearing the same words spoken out aloud during a team meeting (direct/verbal/public).

The following definition of EA-SI combines different understandings of appreciation and specific actions and/or messages that are believed to transport appreciative signals in a single construct. EA-SI means feeling conditionally acknowledged for achievements and competencies (Stocker et al., 2014). It means that the appreciation receiver has the feeling that the appreciator listens to them and is authentically interested in their contributions (e.g., Stocker et al., 2019; Yukl et al., 2002). The more the appreciation receiver feels respected (Apostel et al., 2018), valued (Kuoppala et al., 2008), and trusted (Semmer et al., 2007), the higher EA-SI should be. EA-SI is manifest when the appreciation receiver experiences an investment of time and resources to ensure their wellbeing, as well as adequate material and non-material recognition (e.g., Semmer et al., 2019), and opportunities for personal and professional development (Siegrist, 2016). EA-SI encompasses the feeling of being unconditionally valued for one’s personality or habits as a human being, regardless of any terms. Integrating fundamental considerations of client-centered (Rogers, 1991) and non-violent communication (Rosenberg, 2015), EA-SI means getting the opportunity to socially and emotionally bond with the appreciator, as well as feeling treated in a non-violent way. Following the premise by Mettler-von Meibom (2007) that the way individuals communicate with each other should be more important in shaping their relationship than the actual message sent, the described actions combined in EA-SI reflect an underlying loving and benevolent attitude of the appreciator experienced by the appreciation receiver.

Going beyond social support—defined as helping behavior toward others (when times are challenging)—appreciation means recognizing one’s counterpart not solely in demanding situations but throughout the ups and downs of their work (Pfister et al., 2020). EA-SI includes acknowledging the appreciation receiver in times of success as well as strengthening them when times are tough (Resch et al., 2025). For a more detailed differentiation between appreciation and social support, Semmer et al. (2019) can be consulted.

In the following deduction of the hypotheses, different studies will be cited that relate appreciation to specific outcome measures. Please note that the results are based on incongruent construct definitions and operationalizations. Nonetheless, these findings are invaluable to deriving the relevance of experienced appreciation for scientific and occupational applications and to pointing out the necessity of developing the new, integrative construct EA-SI. For a more detailed overview of various understandings of appreciation, see also Resch et al. (2025).

2.3 Theoretical integration of EA-SI

We built the EA-SI model upon the assumptions of the well-established SOS theory (Semmer et al., 2007, 2019). To develop a solid theoretical foundation, we will comprehensively discuss other established theories and justify our decision for the SOS theory.

2.3.1 The SOS theory as theoretical framework for EA-SI

In occupational health, various theories exist to explain employee wellbeing, motivation, and satisfaction. Hence, the question arises upon which of these theories EA-SI should be built on. Besides the SOS theory, two other well-known theories are Bakker and Demerouti Job Demands-Resources theory (2014; JDR) and the Conservation of Resources theory (Hobfoll et al., 2016; COR).

The JD-R differentiates between resources and demands at work. Higher resources are associated with increased motivation, while higher demands lead to increased strain at work. Both pathways are believed to influence each other intersectionally. Ultimately, employee motivation and strain result in organizational outcomes such as absenteeism (Clausen et al., 2012) or job performance (Bakker et al., 2007). The COR focuses on the maintenance and protection of resources. It combines personal, social, and structural resources by assuming that the loss of these resources results in the sensation of stress. In contrast, conserving these resources should be a protective strategy against stress. Consequently, the loss of resources—weighing heavier than gaining new resources—should result in adverse (organizational) outcomes (Hobfoll et al., 2016).

Thus, the JD-R and COR define different resources and demands that can intensify or buffer each other within complex interplays. While the JD-R distinguishes between demands and resources, the COR theory distinguishes between three distinct categories of resources. In contrast, the SOS theory puts the individual's self-esteem in the center of attention. The theory proposes that it is a basic human need to maintain and protect a positive self-esteem. The SOS theory defines specific boosts and threats that are directly related to the self (Semmer et al., 2019). Other than resources that can be buffered crosswise, the presence of a threat to the self represents a severe attack on the underlying human need, resulting in a stress reaction.

This deep-reaching focus on the human self-esteem is where the focal point of the SOS theory differs from other theories. Experienced appreciation is based on individual performance and achievements but also represents the feeling of being evaluated as a human being with one's personality, habits, and self. We believe that appreciation should not be understood as one resource among others that could be conserved or used to buffer specific demands, but as an influential factor that reaches deeper by strengthening or threatening the individual's self-esteem and, therefore, fulfilling or endangering a basic human need. This is why we decided to build EA-SI based on the SOS theory. For a more diversified discussion of other theories in contrast to the SOS theory, please see Semmer et al. (2019).

2.3.2 The SOS theory—EA-SI and self-esteem

A core assumption of the SOS theory is that protecting and maintaining a positive self-esteem represents a basic human need (Semmer et al., 2007, 2019). *Self-esteem* includes social and personal components (Lazarus, 2006; Semmer et al., 2019). Personal self-esteem focuses on self-evaluation and acknowledgment of one's worth. Social self-esteem involves actions, feedback, and evaluation provided by the social environment (Semmer et al., 2019) relating to employees' work-associated identities (Pfister et al., 2020). Both types of self-esteem are interrelated (Semmer et al., 2019).

Since it is a basic need to protect the self-esteem, there are specific threats or boosts to it (Semmer et al., 2007). Boosts are actions or environmental sensations—felt at work—that reflect positive evaluations of performance or personality and, therefore, strengthen one's self-esteem. Threats to the self are negative or devaluating messages received directly or indirectly from one's (work) environment (Semmer et al., 2019). In line with De Cremer and Tyler (2005)—who showed that respectful intragroup interactions can strengthen but also threaten work-related identity depending on their expression—we assume that EA-SI can function as a boost but also as a threat to employees' self-esteem if absent.

The work context is one of the most important and identity-shaping environments within individuals' lives (Ashforth and Schinoff, 2016). Since the personal and social self-esteem are intertwined, we expect experienced appreciation to be related to employees' global self-esteem, including social and personal aspects in a single construct (von Collani and Herzberg, 2003). The *global self-esteem* is based on the overall self-evaluation of one's personal worth, traits, and personality (Brown, 2010; Schütz and Röhner, 2025). Higher global self-esteem favors a more self-loving attitude toward oneself, buffering the negative impact of being confronted with failure (Brown, 2010). The global self-esteem is more driven by personal evaluation than objective parameters. Nonetheless, the subjective evaluation of one's self is strongly influenced by the social environment and the assessment through others (Leary and Baumeister, 2000). Consequently, we assume that experienced appreciation at work does not influence one aspect of employees' self-esteem but their global self-esteem.

H1a: The more employees feel appreciated by their colleagues, the higher their self-esteem.

H1b: The more employees feel appreciated by their direct supervisors, the higher their self-esteem.

2.3.3 The SOS theory—EA-SI and stress

Threats to the self-result in a stress reaction (Semmer et al., 2019). The SOS theory differentiates two forms of stress, stress through insufficiency (SIN) and stress as disrespect (SAD). SIN occurs when individuals perceive themselves, their abilities, and their achievements as falling short of self-defined goals. SAD results from interactions with others that lead to feelings of inadequacy or devaluation (Semmer et al., 2019).

We believe that EA-SI at work influences both forms of stress. Appreciation at work influences whether employees feel treated respectfully and—understood as feedback from others—determines whether they feel sufficient to master demands. The

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sensation of feeling insufficient should be influenced by the evaluation from and actions of others, and vice versa. We believe that (non-)appreciative experiences at work influence employees' global self-esteem and general stress perception. The *general stress perception* combines the dimensions of worries, tension, demands, and joy in one construct (Fliege et al., 2001). We believe that employees who have to defend against threats to their self-esteem—due to low levels of EA-SI at work—experience less joy and more worries, demands, and tension. To replicate the fundamental assumptions of the SOS theory, we also expect lower self-esteem to be related to an increased perception of stress (Pfister et al., 2020; Semmer et al., 2019; Stocker et al., 2014).

H2a: The less employees feel appreciated by their colleagues, the higher their stress perception.

H2b: The less employees feel appreciated by their direct supervisors, the higher their stress perception.

H3: The lower employees' self-esteem, the higher their stress perception.

2.3.4 EA-SI and employee satisfaction

Experienced stress can result from low levels of experienced appreciation (Semmer et al., 2007) and relate to negative outcomes such as impaired wellbeing, health, and satisfaction (Siegrist, 2016; Stocker et al., 2010). Stress is also linked to depressive symptoms (Sakata et al., 2008), sleep disturbance, and fatigue (Fahlén et al., 2006). Chronic stress exposure relates to higher blood pressure, higher levels of cortisol, and an elevated risk of coronary diseases (Marmot et al., 2002).

Al-Aali and Ahmed (2022) found a negative correlation between perceived stress (in terms of an imbalance between effort and reward) and employee work satisfaction. In line with this, low levels of appreciation at work—as a stress-inducing factor—also predicted lower work satisfaction (Pfister et al., 2020; Semmer et al., 2005). *Satisfaction with work* reflects the subjective evaluation of recent professional activities and the organizational environment compared to personal expectations and needs (Irawanto et al., 2021). Consequently, high satisfaction with work should occur when the desired state at work aligns with the actual environment and demands. Hence, we expect employees who feel appreciated to be more satisfied at work.

H4a: The more employees feel appreciated by their colleagues, the higher their job satisfaction.

H4b: The more employees feel appreciated by their direct supervisors, the higher their job satisfaction.

We do not understand employees' work lives and the appreciation they do or do not receive at work as unrelated to other aspects of their lives. On the contrary, we believe that sensations at work spill over into other aspects of one's life. Examples of spillover are work-family conflicts, describing specific events from the work sector that impact employees' lives outside their work (Cao et al., 2020; Wolfram and Gratton, 2014). This spillover can result in positive and negative outcomes. For example, negative events at work impair sleep quality (Liu

et al., 2020), while positive events relate to greater life satisfaction (Stevanovic and Rupert, 2009). Moreover, Yildirim et al. (2024) showed that the experience of a meaningful life mediated the relation between occupational stress and satisfaction at work. Hence, we believe that EA-SI does not solely influence employees' job satisfaction but should also—associated with higher self-esteem and reduced perception of stress—relate to their overall life satisfaction.

The individual's wellbeing includes cognitive and emotional components (Keyes et al., 2002). In this article, we focus on employees' *satisfaction with life*, defined as the cognitive evaluation of whether a person's life meets their personal standards, expectations, and preferences (Diener et al., 1985). In line with the expected spillover between different areas of employees' lives (Lourel et al., 2009), we assume work and life satisfaction to be interrelated (Rain et al., 1991).

H5a: The more employees feel appreciated by their colleagues, the higher their life satisfaction.

H5b: The more employees feel appreciated by their direct supervisors, the higher their life satisfaction.

H6: The more satisfied employees are with their work, the higher their overall life satisfaction.

2.3.5 EA-SI and employee motivation

To further evaluate EA-SI's criterion validity, we examined whether experienced appreciation relates to employee engagement at work. *Work engagement* characterizes the feeling of energy, inspiration, and motivation regarding one's work (Schaufeli et al., 2006). Work engagement is linked to employees' health and organizational commitment (Christian and Slaughter, 2007), as well as to higher work satisfaction (Mazzetti et al., 2023) and decreased burnout (Maricuțoiu et al., 2017). Meta-analytic evidence showed that job resources—present at group- and leader-level—can increase work engagement (Lesener et al., 2019). In line with these findings, higher appreciation at work is also related to higher job-related motivation (DiPietro et al., 2014) and, in terms of adequate reward, benefits work engagement (Al-Aali and Ahmed, 2022). Thus, we derive the following hypotheses.

H7a: The more employees feel appreciated by colleagues, the higher their work engagement.

H7b: The more employees feel appreciated by direct supervisors, the higher their work engagement.

2.3.6 EA-SI and employee wellbeing

Emotional exhaustion represents one of three dimensions of burnout (Korczak et al., 2010). The other two facets are loss of meaning (Wörfel et al., 2015) and a feeling of reduced performance (Korczak et al., 2010). Emotional exhaustion encompasses feelings of fatigue, the perception of insurmountable demands, and an impaired ability to emotionally connect to others (Korczak et al., 2010). It is related to stress (Jiménez-Ortiz et al., 2019) and represents an important measure of employee wellbeing (Crawford et al., 2010). Emotional Exhaustion

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is related to stress (Teo et al., 2021), dysregulation of the hypothalamic stress axis, chronic inflammation, and poor sleep quality (Melamed et al., 2006). In turn, resourceful social interactions at work are associated with less burnout (Maslach and Leiter, 2017). To test for criterion validity, we assume that EA-SI—related to employees' stress perception—should also be negatively related to emotional exhaustion. Figure 1 sums up the EA-SI model.

H8a: The more employees feel appreciated by colleagues, the lower their emotional exhaustion.

H8b: The more employees feel appreciated by direct supervisors, the lower their emotional exhaustion.

3 Study one

We designed the first study to revise the operationalization of EA-SI. Therefore, we theoretically derived a first draft of the EA-SI Work Scale. This draft was evaluated for its content validity and tested in a branch-heterogeneous sample against established psychometric standards in scale construction (Bortz and Döring, 2006; Moosbrugger and Kelava, 2008; Pospeschill, 2013). Based on all criteria, further elaborated in Section 3.1.6, we developed the revised EA-SI Work Scale and explored its reliability and dimensional structure.

In addition to scale construction, the first study serves as a pilot to validate the EA-SI Work Scale. Hence, the scale's criterion validity was evaluated in additional correlation analyses. Please note that we will use the term "EA-SI" to refer to the theoretical construct, while we will use the scale's full name when referring to the construct's operationalization.

3.1 Method—study one

3.1.1 Transparency and openness

We described all measures and transparently reported data exclusion and manipulation. We used JASP 0.18.3 (JASP Team, 2024) and R (R version 4.4.1, R Core Team, 2024) within the RStudio environment (Version 2024.12.1) to analyze the data. The analyses in R were performed using the "tidyverse" (vo.2.0.0; Wickham et al., 2019), "lavaan" (vo.06-19; Rosseel, 2012), "psych" (vo.4.6.26; Revelle, 2024) and "lm.beta" (vo. 1.7-2; Behrendt, 2023) packages. The processed data—referring to the revised EA-SI Work Scale—are publicly available via osf.io using the link https://osf.io/m8ucv/?view_only=cb8b7bb959cb468082c25d305b9e0ddb. All instruments of relevance to this article are included. No code was uploaded. This study was not preregistered. There is a preprint available via osf.io following the link https://doi.org/10.31219/osf.io/rztc9_v1. Please note that the current article has been updated substantially during the review process, clarifying several erroneous information and reworking essential details in distinction to the first preprint. Moreover, as a continuation of the current article and its insights, Resch et al. (2025) developed a short scale to measure EA-SI at work. Although the short scale has been published prior to the current article, it is chronologically built on it.

3.1.2 Design and acquisition

In Study One, we used a cross-sectional, field-study design. To obtain a heterogeneous sample, we recruited participants in Germany using a variety of methods, including mail, phone, on-site recruitment, and flyers in Spring 2022. The online questionnaire was generated with SoSci Survey (Leiner, 2024). Participants were informed that participating in the survey was voluntary, that they could end their participation at any point, and that their data collection and analysis were anonymous. The study was approved by the ethics committee of the Johannes Gutenberg University Mainz.

3.1.3 Sample

We conducted a power analysis with a significance level of $p = 0.05$ and a power of 0.95, limiting the alpha and beta error to a maximum of 5%. With a moderate correlation coefficient of $r = 0.30$ (Cohen, 1988), the analysis implied a sample size of $N = 138$ (Hemmerich, 2018).

We collected $N = 422$ cases. To be considered for the survey, participants had to be between the age of 18 and 79, have daily contact with colleagues and direct supervisors, and work at least 8 h per week.

To ensure data quality, we excluded surveys that had not been fully completed ($n = 173$), participants who reported in the honesty item that they were unconcentrated or unconscientious ($n = 5$), and participants who answered <80% of the EA-SI Work Scale ($n = 13$).

The final sample included $N = 231$ participants. Of these, 64.9% were female, 34.6% were male, and 0.4% were non-binary. Ages ranged from 19 to 65 [*mean* (M) = 37.9, *standard deviation* (SD) = 14.62]. One-fourth (25.5%) reported working in temporary employment, 57.2% had permanent employment, and 17.3% worked as civil servants. The sample included a wide range of occupations. If grouping the participants descriptively, the recruited professions spread across the branches "education & social work" (e.g., teacher, social worker), "communication & finance" (e.g., manager, banker), "IT & engineering" (e.g., software developer, construction manager), "service industry" (e.g., receptionist, waitress), "science" (e.g., researcher, auxiliary scientist), "civil service" (e.g., police officer, career counselor), and "healthcare" (e.g., nurse, medical assistant).

3.1.4 The EA-SI work scale

To investigate EA-SI for different groups of appreciators, we developed one scale for colleagues and one for direct supervisors as appreciators. The first draft of the EA-SI Work Scale included $k = 112$ items. Fifty-six items focused on experienced appreciation from colleagues. The remaining items focused on direct supervisors as appreciators. The items were derived by combining different manifestations of supposedly appreciative messages/actions based on various understandings of appreciation integrated in the EA-SI model. This extensive item set was developed to ensure that the revised instrument included a sufficient number of items that could be evaluated as content valid and non-redundant but also survived the selection process. We chose that procedure to ensure that all relevant aspects of EA-SI were covered, even if specific items had

Visualization of the EA-SI Model

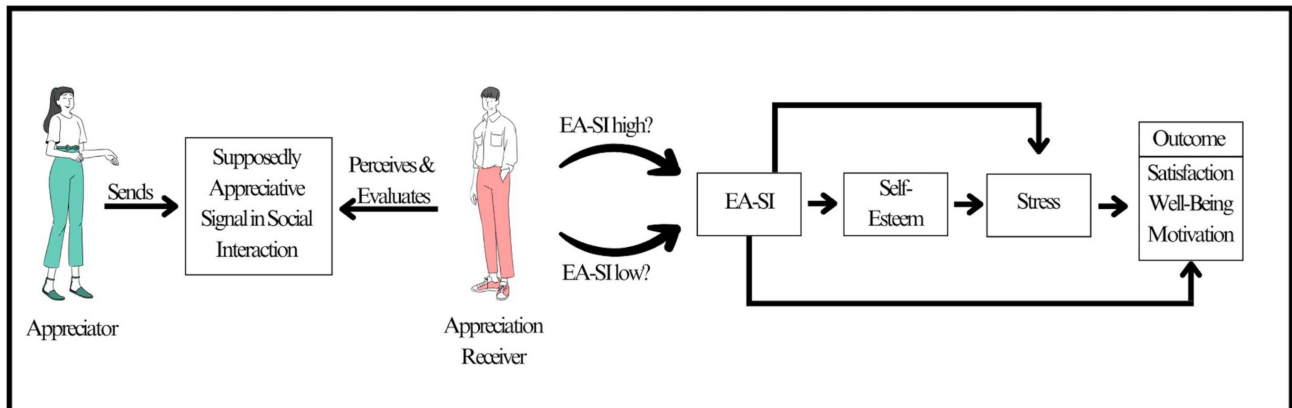


FIGURE 1
Visualization of the EA-SI model. Note. The model combines EA-SI with the SOS theory and basic considerations of communication.

to be removed due to quality issues. The scale ranged from 1 (*does not apply*) to 10 (*does apply*), including a fallback option to indicate that the item did not apply to the individual's work reality at all. A sample item reads, "My colleagues/supervisors show me that they know and appreciate my strengths."

3.1.5 Validation instruments

The German Rosenberg Self-Esteem Scale measured global self-esteem with $k = 10$ items (von Collani and Herzberg, 2003). The scale ranges from 1 (*not at all*) to 6 (*completely*). A sample item is "[o]verall, I am satisfied with myself."

The perceived stress level of participants was measured using the German version of the Perceived Stress Questionnaire with $k = 20$ items (Fliege et al., 2001, 2009). The four-point rating scale ranges from 1 (*almost never*) to 4 (*most of the time*). One sample item is "[h]ow often do the following statements apply ... You feel tense."

Workplace satisfaction was measured with $k = 3$ German items, referring to Baillod and Semmer (1994). The items could be answered on one of two different seven-point rating scales, ranging from 1 (*exceedingly unsatisfied*) to 7 (*exceedingly satisfied*) and from 1 (*hardly ever*) to 7 (*very often*). An example is "[h]ow satisfied are you in general with your work?"

We used $k = 5$ items of the German version of the Satisfaction With Life Scale (Janke and Glöckner-Rist, 2012) to assess life satisfaction. The seven-point Likert scale ranges from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item is "[i]n most ways, my life is close to my ideal."

Using the Utrecht Work Engagement Scale-9 (UWES-9), we addressed work engagement with $k = 9$ items (Schaufeli et al., 2006). The items ranged from 1 (*never*) to 7 (*every day*). A sample item is "I am enthusiastic about my work."

Referring to Korczak et al. (2010), we used $k = 9$ items of the Maslach Burnout Inventory, translated into German, to measure emotional exhaustion. We offered participants a seven-point rating scale from 1 (*never*) to 7 (*every day*). A sample item is "After working, I feel exhausted."

To ensure consistency regarding the time for different measures, we instructed participants to reflect on the past 3 months. To eliminate order effects, we randomized the item presentation within the instruments. Additionally, Study One surveyed effort-reward imbalance, social support, turnover intention, various measures of appreciation, and employee absenteeism. Those measures are not relevant to this article.

3.1.6 Statistical analyses

In the first step, we asked naïve and expert judges to evaluate the items' content validity as well as their verbal and formal redundancy. Subsequently, we tested the item set with $k = 56$ for each group of appreciators against established quality standards in instrument construction (Moosbrugger and Kelava, 2008; Pospeschill, 2013) to revise the first draft of the EA-SI Work Scale. Following the described standards, all items with a skewness ≥ 2 , an excess ≥ 7 (West et al., 1995), an item difficulty above 0.8 or below 0.2, and with a discriminatory power ≤ 0.3 (Bortz and Döring, 2006) were excluded. Additionally, we decided to exclude items that did not apply to the work of more than 20% of participants. This cutoff was defined based on a visual analysis of data distribution. On average, participants chose the fallback option considerably less frequently. In a third step, we synchronized the remaining items so that only the items that survived the selection process for both groups of appreciators were kept. Since we aimed to develop a versatile but also time-economic applicable scale, we decided that the time to answer the EA-SI Work Scale should not exceed 2 min for each group of appreciators. To determine the estimated response time, we used an established mathematical equation from market research that considered the word count, the number of decisions participants had to make, and the number of items (Puleston, 2012). The equation indicated a duration of $d \sim = 2$ for a maximum of $k = 15$ items. The detailed formula can be found in Appendix A.

To investigate the dimensional structure of EA-SI, we conducted exploratory factor analyses (EFA) based on the revised

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EA-SI Work Scale. MacCallum et al. (1999) and Harlow (2014) recommended a sample size of between 200 and 400 participants for factor analyses. Based on this criterion, the sample size is adequate. We used the maximum likelihood method with orthogonal varimax rotation, scree plots, and parallel analysis (O'Connor, 2000) to identify the number of extracted factors.

To test for criterion validity, we conducted Pearson product-moment correlations. To evaluate the strength of the correlations, we applied the cutoff values by Cohen (1988), assuming $r \geq 0.1$ to indicate a small, $r \geq 0.3$ a moderate, and $r \geq 0.5$ a strong correlation. As a level of significance, we applied $p < 0.05$ (Fisher, 1956).

Since the data is based solely on self-reported measures, we tested for common method bias (CMB) in both studies. All analyses on CMB can be found in Appendix B. Referring to Fuller et al. (2016), in Study One, we tested for common method bias using Harman's single-factor test. Substantial common method bias should be present if a single factor would explain more than 50% of the variance (Fuller et al., 2016). Referring to the assumptions by Söhnchen (2009), we additionally computed a scree plot and parallel analysis to examine whether the exploratory factor analysis would imply a single-factor solution, also indicating substantially biased data.

3.2 Results

3.2.1 Item selection

First, we excluded one item for both groups of appreciators that did not apply to the work of more than 20% of participants. We then eliminated $k = 7$ items for colleagues and $k = 4$ items for direct supervisors that had a skewness ≥ 2 . In contrast, all items met the criteria of excess ≥ 7 (West et al., 1995). Third, we excluded $k = 11$ items for colleagues and $k = 8$ items for direct supervisors with an item difficulty above 0.8 or below 0.2. Finally, we eliminated $k = 1$ item for colleagues and $k = 2$ items for direct supervisors with a discriminatory power ≤ 0.3 (Bortz and Döring, 2006).

In the next step, we synchronized the item sets for both groups of appreciators. Therefore, we only kept the items that met the described psychometric criteria for both colleagues and direct supervisors. $k = 3$ items met the criteria for direct supervisors but not for colleagues, while $k = 8$ different items met the criteria for colleagues but not for direct supervisors. We eliminated these items so that both scales consisted of a comparable set of $k = 34$ items.

Considering all criteria, we decided to eliminate $k = 19$ additional items, with either low content validity, high verbal redundancy, or high formal redundancy. The $k = 15$ items of the revised EA-SI Work Scale can be found in Appendices C–F. In all future analyses, only the items of the revised instrument were considered.

3.2.2 Factor structure of EA-SI—colleagues as appreciators

Since the total number of unanswered items was 4.4% and, therefore, well below the recommended 10% suitable for mean imputation (Watkins, 2018), we substituted missing values with

the item's arithmetic mean prior to factor analyses. The Kaiser–Meyer–Olkin criterion (Kaiser, 1974; KMO) showed an overall sampling adequacy of $KMO = 0.93$, suggesting that the data were “marvelously” suitable for EFA (Watkins, 2018). Bartlett's test of sphericity (Bartlett, 1954) indicated a non-random data structure $\chi^2_{(105)} = 1626.96$, $p < 0.001$. The scree plot and the parallel analysis indicated a one-dimensional solution for EA-SI (O'Connor, 2000; Watkins, 2018). The model was significant $p < 0.001$. The Eigenvalue for the factor was 6.88. The model accounted for 42.4% of the variance.

3.2.3 Factor structure of EA-SI—direct supervisors as appreciators

For direct supervisors, the $KMO = 0.96$, as well as Bartlett's test of sphericity $\chi^2_{(105)} = 2438.39$, $p < 0.001$, identified the data as suitable for EFA (Watkins, 2018). The scree plot and parallel analysis implied a single-factor solution (O'Connor, 2000; Watkins, 2018). The Eigenvalue was 8.48. The model was significant $p < 0.001$ and explained 53.8% of the item variance. Table 1 shows the factor loadings for all items separated by the groups of appreciators, while Figure 2 depicts the related scree plots and parallel analyses of the EFA.

3.2.4 Testing for common method bias

Harman's single-factor test indicated that a one-factor solution would explain 31.5% of the variance. The computed scree plot and parallel analysis implied a six-factor solution. Since these results imply no substantial evidence for common method bias, all analyses are computed without further controlling for CMB.

3.2.5 Validation of the EA-SI work scale—criterion validity

As predicted, EA-SI was positively correlated with employees' global self-esteem (colleagues: $r = 0.36$, $p < 0.001$; direct supervisors: $r = 0.35$, $p < 0.001$) and negatively correlated with perceived stress (colleagues: $r = -0.46$, $p < 0.001$; direct supervisors: $r = -0.53$, $p < 0.001$). In line with the SOS theory, global self-esteem and perceived stress were negatively correlated with each other ($r = -0.55$, $p < 0.001$).

EA-SI was positively related to work satisfaction (colleagues: $r = 0.47$, $p < 0.001$; direct supervisors: $r = 0.55$, $p < 0.001$) and life satisfaction (colleagues: $r = 0.30$, $p < 0.001$; direct supervisors: $r = 0.31$, $p < 0.001$) as well as to work engagement (colleagues: $r = 0.41$, $p < 0.001$; direct supervisors: $r = 0.49$, $p < 0.001$). EA-SI was negatively related to emotional exhaustion (colleagues: $r = -0.52$, $p < 0.001$; direct supervisors: $r = -0.56$, $p < 0.001$). Employee work satisfaction was positively correlated with life satisfaction ($r = 0.35$, $p < 0.001$). Table 2 summarizes the mean, standard deviation, internal consistency, and correlations of all instruments.

4 Study Two

The second study included two time points of measurement. Study Two aimed to (1) replicate the unidimensional factor

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TABLE 1 Exploratory factor analyses EA-SI work scale separated by groups of appreciators—study one.

Item	Factor 1	Uniqueness	Item	Factor 1	Uniqueness
EA-SI_1_coll	0.86	0.27	EA-SI_1_sup	0.91	0.18
EA-SI_2_coll	0.84	0.30	EA-SI_2_sup	0.88	0.22
EA-SI_3_coll	0.80	0.40	EA-SI_3_sup	0.88	0.23
EA-SI_4_coll	0.74	0.45	EA-SI_4_sup	0.85	0.27
EA-SI_5_coll	0.72	0.49	EA-SI_5_sup	0.85	0.28
EA-SI_6_coll	0.72	0.49	EA-SI_6_sup	0.84	0.29
EA-SI_7_coll	0.68	0.54	EA-SI_7_sup	0.79	0.38
EA-SI_8_coll	0.64	0.59	EA-SI_8_sup	0.78	0.40
EA-SI_9_coll	0.62	0.62	EA-SI_9_sup	0.72	0.48
EA-SI_10_coll	0.60	0.64	EA-SI_10_sup	0.67	0.56
EA-SI_11_coll	0.52	0.73	EA-SI_11_sup	0.64	0.59
EA-SI_12_coll	0.50	0.76	EA-SI_12_sup	0.63	0.61
EA-SI_13_coll	0.50	0.76	EA-SI_13_sup	0.48	0.77
EA-SI_14_coll	0.45	0.79	EA-SI_14_sup	0.43	0.82
EA-SI_15_coll	0.42	0.83	EA-SI_15_sup	0.38	0.86

The left part shows factor loadings for colleagues the right part for direct supervisors.

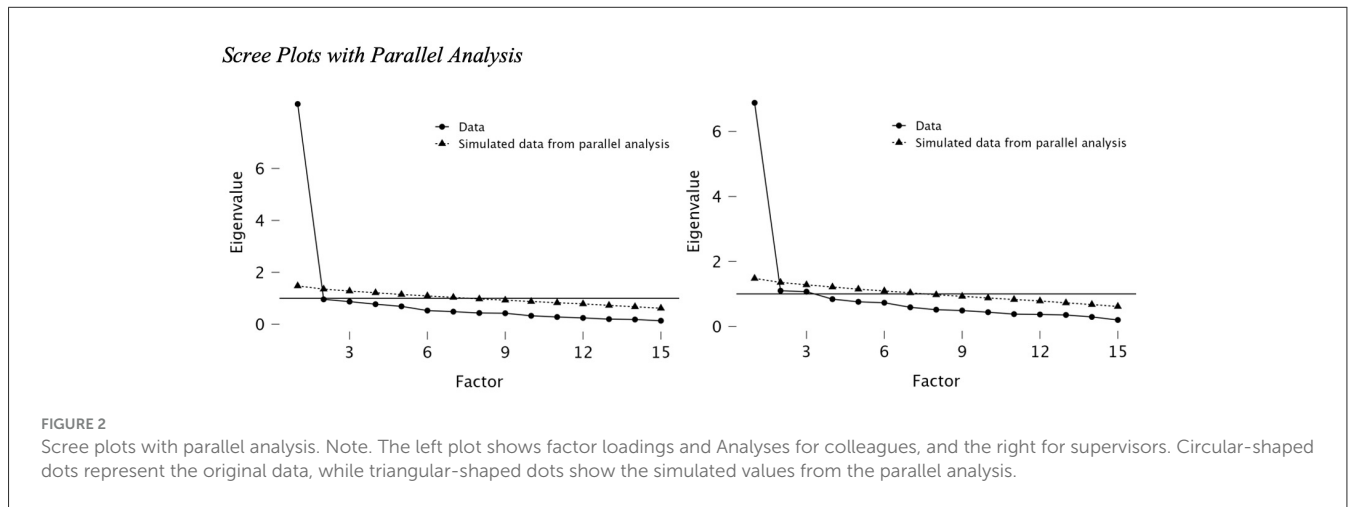


TABLE 2 Pearson product-moment correlations—study one.

Constructs	M	SD	α	1	2	3	4	5	6	7	8
1. EA-SI—colleagues	7.59	1.51	0.91	—							
2. EA-SI—supervisors	7.26	2.01	0.94	0.64**	—						
3. Self-esteem	5.05	0.88	0.90	0.36**	0.35*	—					
4. Perceived stress	2.23	0.67	0.94	−0.46**	−0.53**	−0.55**	—				
5. Workplace satisfaction	4.76	1.55	0.76	0.47**	0.55**	0.29**	−0.55**	—			
6. Life satisfaction	5.26	1.16	0.88	0.30**	0.31**	0.56**	−0.59**	0.35**	—		
7. Work engagement	5.10	1.35	0.94	0.41**	0.49**	0.37**	−0.51**	0.67**	0.39**	—	
8. Emotional exhaustion	2.76	1.42	0.92	−0.52**	−0.56**	−0.43**	0.75**	−0.64**	−0.40**	−0.42**	—

Mean (M), standard deviation (SD), and Cronbach's alpha (α) are displayed. All correlations were tested one-sided with N = 231 participants. *p < 0.05, **p < 0.01.

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structure of EA-SI in a larger, independent sample, to (2) test the construct, (3) criterion, and (4) incremental validity of the EA-SI Work Scale, and to (5) investigate its test-retest reliability over a period of 4 weeks.

To investigate the construct validity of EA-SI, we added instruments to measure interpersonal justice, appreciation, workplace ostracism, and political beliefs. Social support served as a control variable when testing the criterion validity. Since we did theoretically derive appreciation and social support but have yet to define the other constructs, we will briefly explain them.

Interpersonal justice can be understood as the part of interactional justice, focusing on the extent to which employees feel treated respectfully and in an affectively sensitive way at work (Colquitt, 2001). Since one aspect of EA-SI addresses feelings of being heard and treated with respect, we expect EA-SI to be positively related to interpersonal justice. Together with alternative instruments to measure appreciation, interpersonal justice was implemented to test for EA-SI's convergent validity.

Furthermore, we examined *workplace ostracism*, defined as the sensation of being left behind or excluded at work (Ferris et al., 2008). Since EA-SI addresses the feeling of connecting and emotionally bonding with others, we expect a negative relation to experiencing exclusion at work. This is why we implemented workplace ostracism to test for discriminant validity.

Additionally, we asked participants about their *political opinions* regarding recent environmental decisions made by the German government. Referring to Ferris et al. (2008)—implying that this instrument is suitable as a measure of discriminant validity—we expect that the personal evaluation of current environmental politics should not be related to experienced appreciation at work.

4.1 Method—Study Two

4.1.1 Transparency and openness

We described all measures and transparently reported data exclusion and manipulation. We again used the same versions and packages of the software JASP and R as in Study One. The processed data is publicly available via the link https://osf.io/m8ucv/?view_only=cb8b7bb959cb468082c25d305b9e0ddb. All surveyed instruments that are relevant to this article are reported. There is no uploaded code. This study was not preregistered. Please note that the sample and data described in the following section were also used by Resch et al. (2025) to initially derive the short scale based on the confirmatory factor analyses of the EA-SI Work Scale. The short scale was then validated in another, independent sample (Resch et al., 2025).

4.1.2 Design and acquisition

The second study used a longitudinal, field-study design with two measurement points in the autumn of 2022. The two surveys were 4 weeks apart. To obtain a heterogeneous sample, we recruited participants in Germany using a variety of methods, including mail, phone, on-site recruitment, and flyers. We collected data using an online questionnaire generated with SoSci Survey (Leiner, 2024)

available via internal servers of the Johannes Gutenberg University. Participants were informed that participating in the survey was voluntary, that they could end their participation at any point, and that their data collection and analysis were anonymous. The ethics committee of the Johannes Gutenberg University approved the study.

4.1.3 Sample

For a regression analysis with two predictors and a moderate $R^2 = 0.13$ (Cohen, 1988), the power analysis implied a sample size of $N = 107$ (Hemmerich, 2019). The applied significance level was $p = 0.05$, and the implemented power was 0.95.

At the first time point of measurement (T1), we collected $N = 541$ cases. We applied the same exclusion criteria as in the first study. Therefore, we excluded all incomplete datasets ($n = 131$), those who reported not answering concentrated or conscientious ($n = 15$), and ($n = 4$) surveys with $<80\%$ of answered items within the EA-SI Work Scale. The final sample at T1 included $N = 391$ participants. Of those, $n = 260$ (66.5%) were female, $n = 129$ (33%) were male, and $n = 2$ (0.5%) identified as non-binary. The youngest participant was 18, the oldest was 71 years old ($M = 34.04$, $SD = 13.67$). More than one-third (34.5%) worked in temporary employment, 51% were permanently employed, 12.8% worked in civil service, and 1.7% worked as freelancers.

At the second point of measurement (T2), we collected $N = 203$ surveys. We excluded $n = 43$ participants who did not complete the questionnaire, $n = 3$ who did not answer the survey concentrated and/or honestly, $n = 13$ with more than 20% of missing values in the EA-SI Work Scale, and $n = 11$ data sets that were not matchable with T1. The final sample of T2 consisted of $N = 134$ participants. Study Two also included a multitude of different professions, spread across the same branches as named in Study One.

4.1.4 Instruments

In Study Two, we again examined EA-SI, self-esteem, perceived stress, work and life satisfaction, work engagement, and emotional exhaustion. We used the same instructions and randomized item presentation as in Study One. To investigate the construct and incremental validity of EA-SI, we included additional instruments, which will be described in the following section.

We implemented three more instruments to measure appreciation at work. The Appreciation at Work Scale (AAWS; Jacobshagen et al., 2008) measures appreciation with $k = 5$ items for colleagues and $k = 5$ items for supervisors. The scale ranges from 1 (*does not apply at all*) to 7 (*does fully apply*). A sample item reads, “[m]y supervisor praises me when I do my tasks well.”

Moreover, we included two additional single-item measures, translated into German, to address appreciation. One item was “[a]together, how satisfied are you with the appreciation you receive from your supervisor?” (Jacobshagen et al., 2008), using a scale ranging from 1 (*extremely unsatisfied*) to 7 (*extremely satisfied*). The second item was “[d]o your colleagues value your work?” (Bakker et al., 2007), applying a scale from 1 (*hardly ever*) to 4 (*very often*).

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To measure interpersonal justice, we translated $k = 4$ items referring to Colquitt (2001) into German and adapted them to focus on colleagues and direct supervisors as sources of interpersonal justice. The scale ranges from 1 (*seldom*) to 5 (*often*). A sample item is “[d]id your colleagues treat you in a polite way?”

To measure workplace ostracism, we translated $k = 3$ of the items of the Workplace Ostracism Questionnaire by Ferris et al. (2008) into German. The seven-point rating scale ranged from 1 (*never*) to 7 (*always*). One item was “[o]thers ignored you at work.”

Participants’ attitudes toward the current German environmental policy were measured with $k = 4$ translated items in analogy to Ferris et al. (2008). Each question used the item stem “[h]ow do you rate the current environmental policy of your government regarding the following qualities ...” Participants rated the policy using four differential scales ranging from 1 (*bad/foolish/harmful/useless*) to 5 (*good/wise/beneficial/useful*).

In analogy to the Social Support Scale (Frese, 1989), we included $k = 5$ adapted items focusing on colleagues and $k = 5$ items focusing on direct supervisors on a four-point Likert scale ranging from 1 (*not at all*) to 4 (*absolutely*). A sample item is “[h]ow much can you rely on your direct supervisors when things get difficult at work?”

In addition, we surveyed personality traits, turnover intention, effort-reward imbalance, sleep quality, employee absenteeism, and presenteeism. Those instruments are of no relevance to this article.

4.1.5 Statistical analyses

First, we examined the factor structure of the EA-SI Work Scale with confirmatory factor analyses (CFA) to test its one-dimensional structure. Since the χ^2 -Test of model fit is sensitive to sample size and model complexity (Kline, 2023), we used the additional fit indices *Comparative Fit Index* (CFI), *Standardized Root Mean Square Residual* (SRMR), and *Root Mean Square Error of Approximation* (RMSEA) to determine the fit of the expected one-factor solution. A CFI > 0.95 (Hu and Bentler, 1999), SRMR < 0.08 (Byrne, 2013), and RMSEA < 0.08 (Awang, 2012) indicate a good model fit. We further implemented the CFI and SRMR since they are—in contrast to the RMSEA—robust to the number of degrees of freedom (Chen et al., 2008).

In addition to the χ^2 -Test, Kenny et al. (2015) recommended to consider the residual covariance matrices or misfit plots to evaluate the global model fit of the factor solution. These matrices depict the dyadic residual variance between the single items of the instrument. A poor fit of the model is indicated in case of high values (Kenny et al., 2015). Following these recommendations, we analyzed the misfit plots for both groups of appreciators. According to Rogers (2024) misfit plots with values (predominantly) below the cutoff of 0.10 indicate a “good” model fit.

To test for common method bias, we applied Harman’s single-factor test (Fuller et al., 2016). As in Study One, an implied single-factor solution explaining more than 50% of the variance should indicate common method bias (Fuller et al., 2016; Söhnchen, 2009). Since Harman’s single-factor test has been controversially discussed for several limitations (Podsakoff et al., 2003), we additionally applied the marker variable technique by Lindell and Whitney (2001). This method recommends the inclusion of a

theoretically unrelated instrument that “can be used as a marker in that any observed relationships between it and any of the other variables can be assumed to be due to common method variance” (Podsakoff et al., 2003, p. 893). As a marker variable, we chose participants’ environmental policy attitude, since we did not expect it to be related to our substantive variables while sharing the same Likert scale format, possibly making it susceptible to “comparable response processes and tendencies” (Simmering et al., 2015). This type of marker should represent an “ideal marker” (Richardson et al., 2009). Referring to Lindell and Whitney (2001), to test for CMB, we chose the smallest positive correlation coefficient between the criterion and the marker variable to compute partial correlations.

To test whether EA-SI fulfills the requirements of a construct-valid instrument, we conducted Pearson product-moment correlations with convergent and discriminant measures. High construct validity is given if EA-SI is positively correlated with convergent measures and negatively or not correlated with discriminant measures (Moosbrugger and Kelava, 2008).

The criterion validity was tested by correlatively replicating the assumptions of the SOS theory. Appendix G shows the internal consistency, mean, standard deviation, and correlations regarding all relevant measures. To evaluate the strength of the Pearson product-moment correlations, we applied the same cutoff values as in Study One (Cohen, 1988).

Moreover, we conducted hierarchical regression analyses—for both groups of appreciators and controlled for social support—to test for EA-SI’s incremental criterion validity. Social support was included in the first model to examine the additional predictive value of EA-SI. The standardized regression coefficients were computed to evaluate the predictive value of EA-SI and social support regarding the described outcome measures. To determine the effect size of the overall model, we computed the adjusted R^2 . Referring to Cohen (1988) we interpret $R^2 \geq 0.02$ as a small, $R^2 \geq 0.13$ moderate, and $R^2 \geq 0.26$ strong effect size.

We then investigated the test-retest reliability for T1 and T2. Due to the 48% dropout rate between the two time points, we had to ensure that T1 and T2 were comparable and that there were no systematic differences between the two samples. Hence, we tested both time points for equivalence (Lakens, 2017) prior to reliability testing. Lower and upper bounds were defined as $\Delta_L = -0.5$ and $\Delta_U = 0.5$ (Lakens et al., 2018). As a level of significance, we applied $p < 0.05$ (Fisher, 1956).

4.2 Results

4.2.1 Validation of EA-SI—factorial validity

We conducted two confirmatory factor analyses, one for colleagues and one for supervisors. While the χ^2 -Test indicated a poor fit for colleagues $\chi^2(N = 391; df = 90) = 180.65, p < 0.001$ and direct supervisors $\chi^2(N = 391; df = 90) = 231.66, p < 0.001$ the additional fit indices pointed toward excellent model fit for colleagues CFI = 0.97, RMSEA = 0.05, SRMR = 0.03 as well as for direct supervisors CFI = 0.97, RMSEA = 0.06, SRMR = 0.03. The additionally computed misfit plots supported the global model fit of the single factor solution.

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TABLE 3 Results of the confirmatory factor analyses—study two.

Measures of fit	Colleagues	Direct supervisors
χ^2	180.65	231.66
df	90	90
p -value	<0.001	<0.001
CFI	0.97	0.97
RMSEA	0.05	0.06
90% CI	[0.04; 0.06]	[0.05; 0.07]
SRMR	0.03	0.03

N = 391 participants. The 90% CI describes the confidence interval of RMSEA.

Table 3 presents all fit indices. The misfit plots are depicted in Appendix H.

4.2.2 Validation of EA-SI—testing for common method bias

Harman's single-factor test showed an explanatory power of 26.3% for the one-factor solution. Following the screeplot and parallel analysis, the extraction of 11 factors was suggested, indicating no substantial common method bias. In line with these findings, partialling out the smallest positive coefficient between the criterion and marker variable did not impact the significance of our results. Since none of the analyses implied substantial common method bias, all further analyses were conducted and interpreted without including the marker variable. As mentioned before, all tests on common method bias are depicted in Appendix B.

4.2.3 Validation of EA-SI—construct validity

The EA-SI Work Scale was positively correlated with the AAWS (colleagues $r = 0.70$, $p < 0.001$; direct supervisors $r = 0.84$, $p < 0.001$) and with the single items (colleagues $r = 0.66$, $p < 0.001$; direct supervisors $r = 0.79$, $p < 0.001$). EA-SI was positively correlated with interactional justice (colleagues $r = 0.37$, $p < 0.001$; direct supervisors $r = 0.50$, $p < 0.001$) and negatively related to workplace ostracism (colleagues $r = -0.27$, $p < 0.001$; direct supervisors $r = -0.22$, $p < 0.001$). EA-SI did not relate significantly to employees' political opinions (colleagues $r = -0.06$, $p = 0.223$; direct supervisors $r = -0.05$, $p = 0.305$).

4.2.4 Validation of EA-SI—criterion validity

First, we investigated the premises of the SOS theory with Pearson product-moment correlations. As theoretically assumed, EA-SI was related to employees' stress perception (colleagues $r = -0.36$, $p < 0.001$; direct supervisors $r = -0.35$, $p < 0.001$) as well as to self-esteem (colleagues $r = 0.26$, $p < 0.001$; direct supervisors $r = 0.24$, $p < 0.001$). Lower self-esteem related to higher perceived stress ($r = -0.56$, $p < 0.001$).

4.2.5 Incremental criterion validity—colleagues as appreciators

EA-SI predicted higher work-related satisfaction ($\beta = 0.47$, $t = 7.93$, $p < 0.001$) above social support ($\beta = 0.11$, $t = 1.95$, $p = 0.05$), $R^2 = 0.28$, $F_{(2,388)} = 78.39$, $p < 0.001$ as well as higher employee life satisfaction ($\beta = 0.20$, $t = 3.03$, $p = 0.002$) above social support ($\beta = 0.15$, $t = 2.23$, $p = 0.026$), $R^2 = 0.09$, $F_{(2,388)} = 21.26$, $p < 0.001$. The more employees felt appreciated, the more engaged they were with their work ($\beta = 0.47$, $t = 7.90$, $p < 0.001$), social support was not a significant predictor after including EA-SI ($\beta = 0.01$, $t = 0.23$, $p = 0.81$), $R^2 = 0.23$, $F_{(2,388)} = 58.33$, $p < 0.001$. EA-SI did not predict lower emotional exhaustion ($\beta = -0.11$, $t = -1.66$, $p = 0.09$) above social support ($\beta = -0.29$, $t = -4.67$, $p < 0.001$), $R^2 = 0.14$, $F_{(2,388)} = 31.66$.

4.2.6 Incremental criterion validity—direct supervisors as appreciators

Higher levels of experienced appreciation related to greater work satisfaction ($\beta = 0.51$, $t = 7.97$, $p < 0.001$) above social support ($\beta = 0.10$, $t = 1.46$, $p = 0.13$), $R^2 = 0.35$, $F_{(2,388)} = 103.7$, $p < 0.001$. EA-SI did not predict employees' overall life satisfaction ($\beta = 0.11$, $t = 1.47$, $p = 0.14$) beyond social support ($\beta = 0.19$, $t = 2.44$, $p = 0.02$), $R^2 = 0.08$, $F_{(2,388)} = 16.79$, $p < 0.001$. EA-SI predicted work engagement ($\beta = 0.478$, $t = 6.85$, $p < 0.001$) above social support ($\beta = 0.01$, $t = 0.21$, $p = 0.83$), $R^2 = 0.23$, $F_{(2,388)} = 60.45$, $p < 0.001$. The more employees felt appreciated by their direct supervisors, the lower their emotional exhaustion ($\beta = -0.21$, $t = -2.8$, $p = 0.005$) when controlled for by social support ($\beta = -0.18$, $t = -2.47$, $p = 0.014$), $R^2 = 0.14$, $F_{(2,388)} = 30.41$, $p < 0.001$.

4.2.7 Test-retest reliability of EA-SI

For colleagues, the tests against the lower bound Δ_L , $t_{(131)} = 5.88$, $p < 0.001$, and against the upper bound Δ_U , $t_{(131)} = 5.61$, $p < 0.001$ were significant. For direct supervisors, the tests against lower Δ_L , $t_{(131)} = 5.01$, $p < 0.001$, and upper bound Δ_U , $t_{(131)} = -6.48$, $p < 0.001$ were also significant. The overall t -test showed no significant difference between T1 and T2 for colleagues $t_{(131)} = 0.131$, $p = 0.896$ and direct supervisors $t_{(131)} = -0.731$, $p = 0.466$. Hence, we investigated the test-retest reliability of EA-SI over 4 weeks. The test-retest reliability was $r = 0.79$, $p < 0.001$ for colleagues, and $r = 0.84$, $p < 0.001$ for direct supervisors.

5 General discussion

Across two studies, we defined, measured, and validated the construct Experienced Appreciation in Social Interactions and the instrument to operationalize it. EA-SI is based on grand, middle-range, and applied theory, integrating various understandings of appreciation in a single construct. It does not solely focus on one specific expression of appreciation but includes conditional (e.g., recognizing one's professional performance and achievements) and unconditional (e.g., valuing the living being behind work and performance) aspects. The assumed mechanism of action is based on the Stress as Offense to

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Self-theory (Semmer et al., 2019) while considering fundamental premises of interpersonal relation and communication (Schulz von Thun et al., 2014; Watzlawick et al., 2016). This article aimed to theoretically and statistically clarify experienced appreciation at work and to contribute to reducing incongruency and incomparability in researching appreciation. The EA-SI Work Scale showed high psychometric quality, reliability, and validity across two independent, branch-heterogenous samples. Subsequently, we will summarize and discuss our findings from both samples and derive implications for researchers and practitioners.

5.1 Discussion of the findings—research questions and hypotheses

5.1.1 Reliability

For colleagues and direct supervisors, the internal consistency of the EA-SI Work Scale was $\alpha > 0.9$ and, therefore, excellent (Blanz, 2021). We examined the instrument's reliability over 4 weeks. With $r \geq 0.8$ the test-retest reliability for both groups of appreciators was good (Moosbrugger and Kelava, 2020).

5.1.2 Factorial validity

The explorative factor analyses in Study One pointed toward the single-factor solution as the most suitable model to describe EA-SI's dimensional structure. We then tested this assumed single-factor solution in a second study using confirmatory factor analyses. Referring to the limitations of the χ^2 -Test—tending to erroneously reject fitting models with increasing sample size (Kline, 2023)—we evaluated the confirmatory analyses based on the combination of the χ^2 -Test and the recommended additional fit indices CFI, SRMR, and RMSEA as recommended by Alavi et al. (2020). Additionally, we followed the recommendations by Kenny et al. (2015), analyzing the misfit plots for both groups of appreciators. While the χ^2 -Test was significant, all additional fit indices and both misfit plots indicated a good to excellent model fit of the one-dimensional solution.

However, we agree with Xia and Yang (2019) who stated that a good model fit based on additional fit indices would mainly show that a specific scale optimization did work. Above the results of factor analysis, it should be essential to substantively reflect on whether the model could be further optimized or does appear applicable in the way indicated by the statistical analysis (Xia and Yang, 2019). Based on the theoretical deduction of EA-SI and previous findings supporting the idea of appreciation as an autonomous, unidimensional construct (Semmer et al., 2019), we conclude that it is substantively reasonable to assume the distinct manifestations of experienced appreciation to be ordered around one central factor. Combining all information, we conclude that the results imply that EA-SI should be treated as a single-dimensional construct. Coherently, the item with the most substantial factor loading for both groups of appreciators was “[m]y colleagues/supervisors show me that I am worth a lot.”

5.1.3 Construct validity

EA-SI was positively correlated with measures of appreciation and interpersonal justice, indicating convergent validity. To address discriminant validity, we examined the correlations between EA-SI workplace ostracism and environmental policy attitude. As expected, EA-SI was negatively related to workplace ostracism and did not substantially relate to participants' political opinions. Hence, the results strengthen the construct validity of the EA-SI Work Scale.

5.1.4 Criterion validity

EA-SI was significantly correlated with self-esteem and reduced stress perception. This was true for colleagues and direct supervisors within both samples. Self-esteem and employee stress perception were negatively correlated in both samples. The correlation coefficients were predominantly moderate to high (Cohen, 1988). These findings are in line with hypotheses 1–3 and the expected relations based on the SOS theory (Semmer et al., 2019).

The more appreciated employees felt, the higher their work and life satisfaction and work-related motivation were. Feeling more appreciated was related to less emotional exhaustion. Work and life satisfaction were positively related to each other. All correlations were significant and predominantly moderate to high in both samples and for both groups of appreciators. Hence, hypotheses 4–8 can be accepted.

5.1.5 Incremental validity of EA-SI

Additionally, we investigated the EA-SI Work Scale's predictive value above social support to determine the incremental validity of the instrument. As expected, feeling appreciated by colleagues explained work satisfaction (with a strong effect size), work engagement (with a moderate effect size), and life satisfaction (with a small effect size) above social support. In line with our assumptions, feeling appreciated by direct supervisors explained work satisfaction (with a strong effect size), work engagement, and emotional exhaustion (with a moderate effect size), above social support.

Nonetheless, contrary to our expectations, EA-SI from direct supervisors was no longer a significant predictor of life satisfaction after controlling for social support. In addition, EA-SI from colleagues did not predict emotional exhaustion above social support.

A statistical explanation for the unexpected findings could be the strong correlation between social support and EA-SI, underestimating the effect of the separate predictors on the criterion and benefiting the erroneous rejection of a significant result due to multicollinearity (Cohen et al., 2003). Furthermore, the remarkably limited variance within the construct social support could also have biased the results of the regression analyses (Darlington, 1978).

When focusing on life satisfaction, it should be mentioned that social support and experienced appreciation were only marginally related to the criterion. Theoretically, these small correlates could be explained since life satisfaction should be fueled by numerous aspects and circumstances exceeding the two

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constructs we examined (Diener et al., 1985). This limited influence of both predictors could be a substantive explanation for the unexpected findings.

When focusing on emotional exhaustion, the results could indicate that there are substantial differences between the influence of appreciation separated by various sources. For example, feeling supported by one's colleagues seems to be suitable to buffer emotional exhaustion, while feeling appreciated by them does not add an incremental benefit. In contrast, feeling seen and valued by one's direct supervisors seems to incrementally benefit the reduction of emotional exhaustion above feeling supported by them. This substantive interpretation of the unexpected findings— ascribing EA-SI by direct supervisors an elevated role in predicting emotional exhaustion—has yet to be tested.

Referring to the hierarchical analyses, we conclude that the results strengthen the assumption that EA-SI goes beyond social support as a predictor for employee satisfaction, wellbeing, and motivation. However, despite our attempts to explain the deviating findings, future research should strive to further delineate EA-SI from other constructs.

5.1.6 Research questions

This section will summarize the answers to the research questions that guided our work. Based on the introduction and the factor analyses, we can answer the first two research questions: EA-SI provides a congruent definition of appreciation, integrating multiple understandings in one construct while using the SOS theory as a theoretical foundation (Q1). Although EA-SI can be shown in multiple ways, the statistical analyses indicated a one-dimensional structure for colleagues and direct supervisors (Q2). The EA-SI Work Scale is a reliable and valid operationalization of this new construct, substantially relating to employee satisfaction, motivation, and wellbeing (Q3). These relations were true for the work context but also for employees' global self-esteem, general stress perception, and satisfaction with life. Hence, the findings support the assumption of spillover dynamics between different areas of life. Work experiences—or more explicitly, appreciative interactions at work—seem to affect employees' lives outside work and vice versa (Q4). These findings were confirmed in both branch-heterogeneous samples and were not limited to specific professions (Q5). Finally, EA-SI provided incremental predictive value beyond social support, strengthening the understanding of experienced appreciation as an autonomous construct rather than a sub-facet of social support (Q6).

5.2 Limitations and theoretical implications

Although we developed an elaborate and integrative theoretical EA-SI model, more than the cross-sectional design is needed to investigate causal effects. Future research should focus on longitudinal designs to better understand and further validate the assumed mechanisms of action of EA-SI.

In spite of using well-established instruments, randomly presenting the item, and implementing various scales with different ranges to counteract common method bias, our data is entirely

based on self-reports. Therefore, we conducted Harman's single-factor test (Fuller et al., 2016), ruling out a single-factor solution for the measured constructs in both studies (Sönnchen, 2009) and applied the marker variable technique by Lindell and Whitney (2001) to control for common method bias. None of these tests implied substantially biased results due to common method variance. Nonetheless, future research should further investigate EA-SI and its relevance for employees' lives within designs based on a variety of methods (Podsakoff et al., 2003) to thoroughly rule out common method bias. For example, biological markers (e.g., stress markers), observational data (e.g., number of tasks well-performed), peer reports, or other data not based on self-reports (e.g., salary, number of promotions, key performance indicators) could be used.

While the branch-heterogeneity in both samples represents a strength of this article, improving the ecological validity of the results, a disproportionate distribution of gender (e.g., non-binary participants) and employment (e.g., freelancers) was included. Future research should strive to replicate the findings of this article in samples with various gender and employment distributions to further strengthen the generalizability of our conclusions. Since both samples were too small for subgroup analyses, future research should also question whether the effects of EA-SI vary in specific subgroups on the personal and organizational level.

Overall, the EFA and CFA, as well as the additional fit indices and misfit plots, substantially supported the unidimensional factor structure of EA-SI. Nonetheless, the results were partially ambiguous. Hence, the assumed single-factor solution has to be replicated and further investigated in independent samples.

As pointed out in previous studies, our results also point toward differences between the appreciation received by supervisors and the appreciation received by colleagues. While Bregenzer et al. (2022) showed that general appreciation at work should be more beneficial than appreciation from supervisors, our results are ambiguous. For example, appreciation from direct supervisors was stronger related to outcome measures than appreciation from colleagues. Contrary to these findings, EA-SI from direct supervisors did not predict employees' life satisfaction above social support, while EA-SI from colleagues did. The question arises whether there is a significant difference between the relevance of collegial appreciation and appreciation from supervisors regarding employees' lives. Future research should attempt to unravel the distinct groups of appreciators and their relevance for appreciation receivers. Moreover, EA-SI should be transferred to and examined in different groups of appreciators and types of relationships (e.g., family interactions, student-teacher interactions, or romantic relationships).

Since the message that is being sent by the appreciator has to be interpreted by the appreciation receiver (Schulz von Thun et al., 2014), the decoding process could be influenced by specific attributes of the appreciation receiver, such as their personality, attitude toward others, or personal beliefs. In line with this, previous findings showed that the individual stress reactivity (Bibbey et al., 2013), as well as the stress experience and coping strategies (Roloff et al., 2022), also varied substantially with specific personality traits. In addition to variables on the intrapersonal level, the relations between EA-SI and relevant outcome measures could

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also be influenced by variables on the interpersonal (e.g., leadership style) and/or organizational level (e.g., work surroundings, job complexity). Therefore, future research should control for potential mediators and/or moderators on these levels.

In addition, it should be noted that both studies are limited to German samples. In line with Triandis (2001)—indicating differences in psychological research between individuals with a collectivistic or individualistic worldview—future research should strive to replicate and validate EA-SI, controlling for culture-related differences.

Despite its benefits, measuring appreciation as a single-factor construct using all $k = 15$ items of the EA-SI Work Scale can be rather time-consuming. Therefore, based on the findings and limitations of the current article, Resch et al. (2025) developed a short scale to measure EA-SI, replicating and extending the knowledge about the construct in relation to employee satisfaction, engagement, and wellbeing. Hence, depending on the objective, researchers should weigh up the benefits and limitations of the long scale in contrast to the short scale and other alternatives when deciding which instrument to use.

5.3 Practical implications

We developed the EA-SI Work Scale for scientific purposes and practical application. The branch-heterogeneity of both samples, suggesting ecological validity (e.g., Kihlstrom, 2021), indicates practical relevance of experienced appreciation for jobholders across versatile professions. In addition, the predominantly moderate to large effect sizes further point toward the relevance of EA-SI for practical use.

The EA-SI Work Scale is characterized by psychometric quality and can easily be evaluated and interpreted by aggregating the answers in one arithmetic mean. The scale integrates conditional and unconditional expressions of appreciation in a theoretically integrative and statistically validated model. The definition of EA-SI—explicitly naming various expressions of appreciative behavior and messages—was designed to be comprehensible and easily applicable to foster organizational development.

Applying the understanding of experienced appreciation in social interactions as a reciprocal process of signals sent and decoded, organizations are encouraged to focus on both appreciators and appreciation receivers when fostering appreciative interactions at work. Hence, on the personal level, appreciators could be instructed on how to send appreciative messages with minimal risk of misunderstanding, while appreciation receivers could be enabled to perceive potential expressions of appreciation mindfully and to reflect on and communicate how they prefer to be appreciated.

On the organizational level, employers could (descriptively) derive specific implications from the results of the EA-SI Work Scale to increase appreciative interactions in their facilities. For example, organizations could implement training programs on professional communication and (active) listening, should the results imply that employees lack the feeling of being authentically listened to. Moreover, companies could offer team-building events and shared experiences, should the results imply a lack of reciprocal

interest and/or opportunities to socially bond with each other. These are just two of the versatile examples of interventions that organizations could derive from the results of the EA-SI Work Scale.

Nonetheless, organizations should devise such interventions cautiously since they have not been experimentally evaluated, and the investigation of the scale's sensitivity to change is pending. Moreover, the possibility should be kept in mind that the targeted manipulation of one single manifestation of EA-SI may not be sufficient to substantially promote the entire construct. On the contrary, it could be possible that an appreciative culture on an overarching level could only be attained if all manifestations of EA-SI would exceed a specific threshold. However, the idea that a specific threshold must be overcome to accomplish a transition from one state to another is abstracted from research on mental states (e.g., Rouder and Morey, 2009) and has yet to be tested for EA-SI.

Considering the strong correlation between EA-SI and the Appreciation at Work Scale as well as the two single items, we recommend that organizations choose the instrument to measure appreciation based on their goals. Organizations interested in measuring appreciation in a more time-efficient way could consider shorter scales like the ones described in this article. Organizations aiming to measure experienced appreciation in a more diversified way—integrating various expressions of conditional and unconditional appreciation—could consider the EA-SI Work Scale.

Conclusively, we encourage professionals across different branches to spread and apply a coherent and comparable definition of appreciation at work. We hope that the construct “Experienced Appreciation in Social Interactions” and the EA-SI Work Scale contribute to countering the incongruency in defining and measuring appreciation and fostering a more appreciative culture at work.

6 Conclusion

Experienced Appreciation in Social Interactions is reliably and validly measurable. It is distinguishable from other constructs and explains outcomes above social support. EA-SI is relevant for employees' wellbeing, stress perception, self-esteem, satisfaction, and motivation. Our findings suggest that these relations are true across a variety of different occupations and areas of employees' lives. Therefore, the EA-SI Work Scale can be used by both researchers and practitioners to investigate experienced appreciation at work. Nonetheless, our findings are based on a newly developed construct and cross-sectional data. Future research is needed to better understand EA-SI and its mechanisms of action.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/Supplementary material.

Ethics statement

The studies involving humans were approved by Ethikkommission des Psychologischen Instituts der Johannes Gutenberg-Universität Mainz. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MR: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. HB: Conceptualization, Data curation, Formal analysis, Methodology, Software, Supervision, Validation, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2025.1445533/full#supplementary-material>

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9 Appendices

9.1 Appendix A – Determination of the Estimated Response Time and Number of Items

$$\text{Duration} = (h(\text{words})/5 + h(\text{questions}) * 5 + (h(\text{decisions}) - h(\text{questions})) * 2 + h(\text{open questions}) * 15) / 60$$

Note. The (estimated) number (h) of words, questions, and decisions must be implemented in the equation. Finally, the results of the equation have to be multiplied with the factor 1.05 if the survey is conducted in German language. This mathematical equation is based on the considerations by Puleston (2012).

9.2 Appendix B – Checking for Common Method Bias

Figure B1

Scree Plot with Parallel Analysis to Test for Common Method Bias – Study One

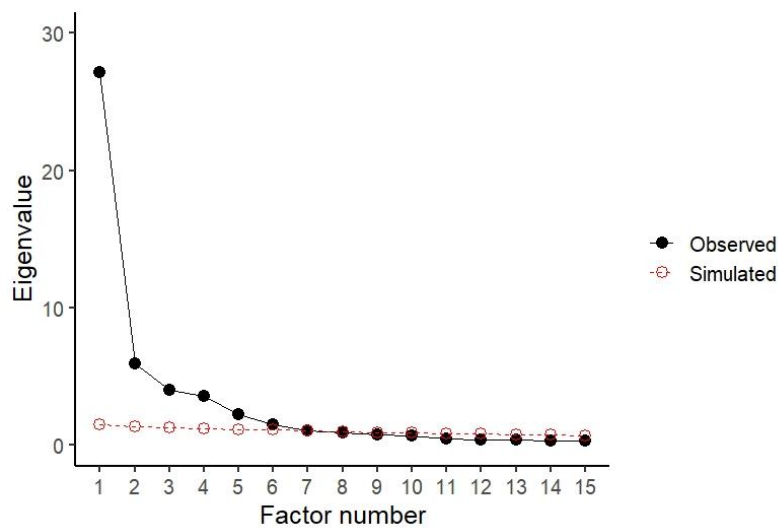


Figure B2

Scree Plot with Parallel Analysis to Test for Common Method Bias – Study Two

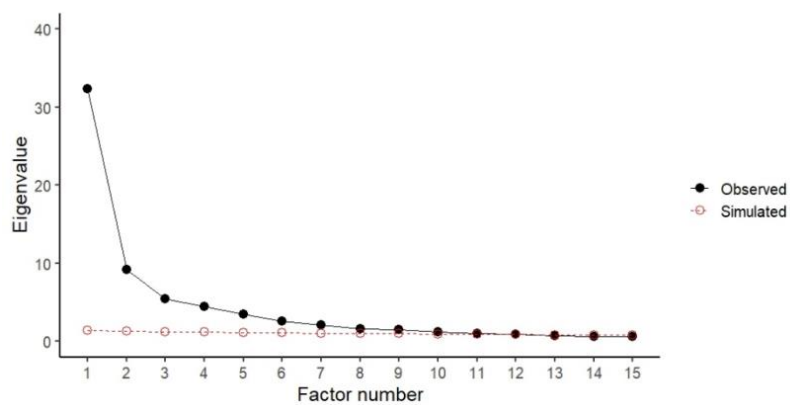


Table B1*Partial Pearson Product-Moment Correlations to Control for Common Method Bias – Study Two*

	M	SD	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. EA-SI - Colleagues	7.02	1.52	.90	—																	
2. EA-SI - Supervisors	6.56	1.96	.93	.65**	—																
3. Self-Esteem	4.83	0.81	.89	.22**	.20**	—															
4. Perceived Stress	2.25	0.56	.93	-.43**	-.42**	-.64**	—														
5. AAWS - Colleagues	5.35	1.09	.85	.69**	.49**	.25**	-.34**	—													
6. AAWS - Supervisors	5.02	1.27	.88	.53**	.83**	.21**	-.46**	.52**	—												
7. Appreciation single - C	3.97	0.90	—	.65**	.47**	.19**	-.41**	.57**	.45**	—											
8. Appreciation single - S	5.19	1.63	—	.48**	.78**	.18**	-.48**	.40**	.78**	.49**	—										
9. Interactional Justice - C	4.47	0.68	.70	.33**	.24**	.22**	-.35**	.36**	.30**	.42**	.30**	—									
10. Interactional Justice - S	4.40	0.80	.79	.29**	.48**	.23**	-.40**	.24**	.52**	.34**	.58**	.64**	—								
11. Workplace Ostracism	1.49	0.64	.75	-.33**	-.29**	-.17**	.15**	-.38**	-.35**	-.40**	-.28**	-.50**	-.41**	—							
12. Marker Variable	3.53	0.80	.87	-.11	-.10	-.09	.09**	-.04	-.11	-.10	-.09	-.09	-.06	—							
13. Emotional Exhaustion	2.81	1.26	.90	-.37**	-.42**	-.48**	.65**	-.33**	-.45**	-.43**	-.48**	-.34**	-.42**	.32**	.00	—					
14. Work Engagement	4.69	1.44	.95	.45**	.46**	.23**	-.44**	.41**	.46**	.38**	.40**	.16**	.19**	-.08	-.10	-.38**	—				
15. Work Satisfaction	4.45	1.58	.84	.51**	.57**	.26**	-.52**	.43**	.53**	.49**	.56**	.28**	.34**	-.19**	-.11	-.54**	.71**	—			
16. Life Satisfaction	5.11	1.07	.87	.26**	.22**	.54**	-.59**	.24**	.25**	.23**	.20**	.17**	.18**	-.21**	-.12	-.45**	.32**	.33**	—		
17. Social Support - C	3.17	0.53	.82	.65**	.42**	.27**	-.41**	.62**	.42**	.56**	.38**	.36**	.28**	-.45**	-.09	-.44**	.29**	.38**	.28**	—	
18. Social Support - S	2.99	0.69	.89	.41**	.76**	.23**	-.48**	.39**	.78**	.34**	.73**	.27**	.50**	-.31**	-.08	-.41**	.35**	.43**	.27**	.51**	—

Note. Mean (*M*), standard deviation (*SD*), and Cronbach's alpha (α) are displayed. All correlations were tested one-sided with a total $N = 391$. * $p < .05$,

** $p < .01$. All analyses are based on T1. Colleagues and supervisors are abbreviated with C and S. The marker variable refers to the variable partialized out of any observed relationship.

DEVELOPING THE EA-SI WORK SCALE

9.3 Appendix C – The EA-SI Work Scale (Colleagues)

Die folgenden Fragen beziehen sich auf die Wertschätzung, die Sie innerhalb Ihres Arbeitsalltages durch andere erfahren. Wichtig ist hierbei, dass es darum geht, wie sehr Sie sich persönlich wertgeschätzt fühlen. Es gibt also keine richtigen oder falschen Antworten. Bitte antworten Sie ehrlich und gewissenhaft. Uns interessieren an dieser Stelle Ihre persönlichen Empfindungen und Einschätzungen. Ihnen werden nachfolgend Aussagen präsentiert, die sich auf Ihre Kolleg:innen beziehen.

Bitte geben Sie an, inwieweit diese Aussagen auf Sie persönlich zutreffen. Erinnern Sie sich hierbei ganz gezielt an die letzten drei Monate. Bitte kreuzen Sie die Option „Kann ich nicht beantworten.“ nur dann an, wenn diese ganz und gar nicht für Ihre berufliche Tätigkeit zutreffend oder zu beantworten ist.

1. Meine Kolleg:innen nehmen meine Einwände ernst.
2. Meine Kolleg:innen zeigen mir, dass sie meine Stärken kennen und schätzen.
3. Häufig vertrauen mir meine Kolleg:innen Aufgaben an, die für das gesamte Team wichtig sind.
4. Meine Kolleg:innen betonen immer wieder, dass sie sich auf mich verlassen können.
5. Ich spüre deutlich, dass meine Kolleg:innen meine Arbeit zu schätzen wissen.
6. Ich fühle mich mit all meinen Erfolgen von meinen Kolleg:innen gesehen.
7. Ich erhalte angemessene **materielle** Geschenke (Pralinen, Blumenstrauß, Nahrungsmittel, kleiner Glücksbringer o.ä.) von meinen Kolleg:innen.
8. Das Bild, das meine Kolleg:innen von mir haben, passt zu dem, was ich jeden Tag leiste.
9. Manchmal fühle ich mich von meinen Kolleg:innen unter Druck gesetzt.
10. Meine Kolleg:innen lassen mich spüren, dass ich viel wert bin.
11. Meine Kolleg:innen zeigen persönliches und fachliches Interesse an mir.
12. Meine Kolleg:innen ermöglichen es mir, Neues zu lernen.
13. Meine Kolleg:innen scheuen keine Kosten oder Mühen, um ein Arbeitsumfeld zu schaffen, in dem ich gut arbeiten kann (Arbeitsumgebung, Materialien, Dekoration und Pflanzen o.ä.).
14. Meine Kolleg:innen teilen auch persönliche und emotionale Themen mit mir.
15. Meine Kolleg:innen geben mir das Gefühl Teil einer Gemeinschaft zu sein.

Trifft nicht zu

Trifft zu

Kann ich nicht beantworten

O	O	O	O	O	O	O	O	O	O	O	O
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DEVELOPING THE EA-SI WORK SCALE

9.4 Appendix D – The EA-SI Work Scale (Colleagues) Translated for Better Understanding

The following questions relate to the appreciation you experience from others during your workday. Please note that the questions are focusing on how appreciated you feel. There are no right or wrong answers. Please respond honestly and conscientiously. We are interested in your personal feelings and evaluations. Following, there will be statements regarding your colleagues.

Please state to what extent these statements apply to you personally. Think about the last three months. Please choose the option "I cannot answer this" if a question is entirely inapplicable or unanswerable regarding your professional activity.

1. My colleagues take my opinion seriously.
2. My colleagues show me that they know and appreciate my strengths.
3. My colleagues often entrust me with tasks that are important to the entire team.
4. My colleagues repeatedly emphasize that they can rely on me.
5. I feel that my colleagues appreciate my work.
6. I feel seen by my colleagues with all my successes.
7. I receive appropriate material gifts (chocolates, bouquet of flowers, food, small lucky charm, etc.) from my colleagues.
8. The image my colleagues have of me matches what I do every day.
9. Sometimes I feel pressured by my colleagues. (r)
10. My colleagues show me that I am worth a lot.
11. My colleagues show personal and professional interest in me.
12. My colleagues make it possible for me to learn new things.
13. My colleagues spare no expense or effort to create an environment where I can work well (e.g., surroundings, materials, decoration/ plants).
14. My colleagues share personal and emotional issues with me.
15. My colleagues give me the feeling of being part of a community.

I disagree

I agree

I cannot answer this

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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DEVELOPING THE EA-SI WORK SCALE

9.5 Appendix E – The EA-SI Work Scale (Supervisors)

Die folgenden Fragen beziehen sich auf die Wertschätzung, die Sie innerhalb Ihres Arbeitsalltages durch andere erfahren. Wichtig ist hierbei, dass es darum geht, wie sehr Sie sich persönlich wertgeschätzt fühlen. Es gibt also keine richtigen oder falschen Antworten. Bitte antworten Sie ehrlich und gewissenhaft. Uns interessieren an dieser Stelle Ihre persönlichen Empfindungen und Einschätzungen. Ihnen werden nachfolgend Aussagen präsentiert, die sich auf Ihre direkte Führungskraft beziehen.

Bitte geben Sie an, inwieweit diese Aussagen auf Sie persönlich zutreffen. Erinnern Sie sich hierbei ganz gezielt an die letzten drei Monate. Bitte kreuzen Sie die Option „Kann ich nicht beantworten.“ nur dann an, wenn diese ganz und gar nicht für Ihre berufliche Tätigkeit zutreffend oder zu beantworten ist.

1. Meine direkte Führungskraft nimmt meine Einwände ernst.
2. Meine direkte Führungskraft zeigt mir, dass sie meine Stärken kennt und schätzt.
3. Meine direkte Führungskraft überträgt mir Verantwortung für wichtige Unternehmensressourcen (Finanzmittel, Personal, Material usw.).
4. Meine direkte Führungskraft betont immer wieder, dass sie sich auf mich verlassen kann.
5. Ich spüre deutlich, dass meine direkte Führungskraft meine Arbeit zu schätzen weiß.
6. Ich fühle mich mit all meinen Erfolgen von meiner direkten Führungskraft gesehen.
7. Ich erhalte angemessene **materielle** Geschenke (Bonuszahlung, Wertgutscheine, Pralinen, Präsente o.ä.) von meiner direkten Führungskraft.
8. Das Bild, das meine direkte Führungskraft von mir hat, passt zu dem, was ich jeden Tag leiste.
9. Manchmal fühle ich mich von meiner direkten Führungskraft unter Druck gesetzt.
10. Meine direkte Führungskraft lässt mich spüren, dass ich viel wert bin.
11. Meine direkte Führungskraft zeigt persönliches und fachliches Interesse an mir.
12. Meine direkte Führungskraft lässt mich spüren, dass sie sieht, was ich alles leiste.
13. Meine direkte Führungskraft scheut keine Kosten oder Mühen, um ein Arbeitsumfeld zu schaffen, in dem ich gut arbeiten kann (Arbeitsumgebung, Materialien, technische Ausstattung, benötigte Software, Angebote für gemeinsame Betriebsausflüge/ Aktivitäten o.ä.).
14. Ich kann mit meiner direkten Führungskraft über persönliche und emotionale Themen sprechen.
15. Meine direkte Führungskraft gibt mir das Gefühl Teil einer Gemeinschaft zu sein.

Trifft nicht zu

Trifft zu

Kann ich nicht beantworten

O	O	O	O	O	O	O	O	O	O	O	O
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DEVELOPING THE EA-SI WORK SCALE

9.6 Appendix F – The EA-SI Work Scale (Supervisors) – Translated for Better Understanding

The following questions relate to the appreciation you experience from others during your workday. Please note that the questions are focusing on how appreciated you feel. There are no right or wrong answers. Please respond honestly and conscientiously. We are interested in your personal feelings and evaluations. Following, there will be statements regarding your direct supervisor.

Please state to what extent these statements apply to you personally. Think about the last three months. Please choose the option "I cannot answer this" if a question is entirely inapplicable or unanswerable regarding your professional activity.

1. My direct supervisor takes my opinion seriously.
2. My direct supervisor shows me that they know and appreciate my strengths.
3. My direct supervisor gives me responsibility for important company resources (e.g., financial resources, personnel, materials).
4. My direct supervisor repeatedly emphasizes that they can rely on me.
5. I feel that my direct supervisor appreciates my work.
6. My direct supervisor sees me with all my successes.
7. I receive appropriate material gifts (e.g., bonus payment, vouchers, chocolates, presents) from my direct supervisor.
8. The image my direct supervisor has of me matches what I do every day.
9. Sometimes I feel pressured by my direct supervisor. (r)
10. My direct supervisor shows me I am worth a lot.
11. My direct supervisor shows personal and professional interest in me.
12. My direct supervisor shows me that they see all my efforts.
13. My direct supervisor spares no expense or effort to create an environment where I can work well (e.g., surroundings, materials, technical equipment, required software, company activities).
14. I can talk to my direct supervisor about personal and emotional issues.
15. My direct supervisor gives me the feeling of being part of a community.

I disagree

I agree

I cannot answer this

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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9.7 Appendix G – Descriptive Measures and Correlation Matrix Study Two

Table G1

Pearson Product-Moment Correlations and Descriptives – Study Two

	M	SD	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. EA-SI - Colleagues	7.02	1.52	.90	—																	
2. EA-SI - Supervisors	6.56	1.96	.93	.67**	—																
3. Self-Esteem	4.83	0.81	.89	.26**	.24**	—															
4. Perceived Stress	2.25	0.56	.93	-.36**	-.35**	-.56**	—														
5. AAWS - Colleagues	5.35	1.09	.85	.70**	.52**	.28**	-.27**	—													
6. AAWS - Supervisors	5.02	1.27	.88	.56**	.84**	.25**	-.38**	.54**	—												
7. Appreciation single - C	3.97	0.90	—	.66**	.50**	.23**	-.34**	.60**	.48**	—											
8. Appreciation single - S	5.19	1.63	—	.50**	.79**	.23**	-.41**	.43**	.79**	.51**	—										
9. Interactional Justice - C	4.47	0.68	.70	.37**	.28**	.26**	-.29**	.39**	.34**	.45**	.34**	—									
10. Interactional Justice - S	4.40	0.80	.79	.33**	.50**	.27**	-.33**	.28**	.54**	.37**	.60**	.66**	—								
11. Workplace Ostracism	1.49	0.64	.75	-.27**	-.22**	-.17**	.19**	-.31**	-.28	-.33**	-.21**	.43	-.34**	—							
12. Attitude Policy	3.53	0.80	.87	-.06	-.05	-.04	.13**	.02	-.05	-.05	-.04	-.03	-.03	.00	—						
13. Emotional Exhaustion	2.81	1.26	.90	-.30**	-.35**	-.41**	.67**	-.27**	-.38**	-.36**	-.41**	-.27**	-.35**	.35**	.05	—					
14. Work Engagement	4.69	1.44	.95	.48**	.49**	.27**	-.37**	.44**	.48**	.42**	.43**	.20**	.23**	-.02	-.05	-.31**	—				
15. Work Satisfaction	4.45	1.58	.84	.53**	.59**	.30**	-.45**	.46**	.55**	.52**	.59**	.31**	.37**	-.13**	-.05	-.46**	.73**	—			
16. Life Satisfaction	5.11	1.07	.87	.29**	.26**	.56**	-.51**	.28**	.29**	.27**	.24**	.21**	.23**	*.15	-.06	-.38**	.35**	.36**	—		
17. Social Support - C	3.17	0.53	.82	.67**	.45**	.30**	-.35**	.64**	.45**	.58**	.41**	.39**	.31**	-.37**	.02	-.37**	.33**	.42**	.28**	—	
18. Social Support - S	2.99	0.69	.89	.44**	.77**	.27**	-.37**	.42**	.79**	.36**	.74**	.30**	.53**	-.25**	-.04	-.34**	.38**	.49**	.27**	.51**	—

Note. Mean (*M*), standard deviation (*SD*), and Cronbach's alpha (α) are displayed. All correlations were tested one-sided with a total $N = 391$.

* $p < .05$, ** $p < .01$. All analyses are based on T1. Colleagues and supervisors are abbreviated with C and S, environmental policy attitude is abbreviated with attitude policy.

9.8 Appendix H – Misfit Plots of the Confirmatory Factor Analyses in Study Two**Table H1***Misfit Plot of the Confirmatory Factor Analysis in Study Two – Colleagues as Appreciators*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0														
2	.07	0													
3	.05	.05	0												
4	.02	.05	.02	0											
5	.01	.04	.02	.03	0										
6	0	.03	.01	.02	.01	0									
7	.02	.05	0	.02	.03	.02	0								
8	.02	.02	.04	0	.01	.01	.01	0							
9	0	.02	.07	0	.04	.01	.02	.06	0						
10	.02	0	.02	.01	.01	.02	.01	.02	.01	0					
11	.01	.02	.04	.04	.05	.01	0	.03	.03	.01	0				
12	.05	.04	.02	.02	.03	.04	.01	.04	.05	0	.09	0			
13	.02	.03	.04	.08	.02	.02	.11	.04	.01	.02	.02	.05	0		
14	.01	.01	.04	.04	.04	.02	.04	.03	.06	.03	.03	.07	.01	0	
15	0	0	.07	0	.04	.03	.14	.02	.03	.03	.06	0	0	.05	0

Note. The items are presented in the order of the EA-SI Work Scale.**Table H2***Misfit Plot of the Confirmatory Factor Analysis in Study Two – Direct Supervisors as Appreciators*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0														
2	0	0													
3	.02	0	0												
4	.04	.03	.05	0											
5	.03	.01	.03	.01	0										
6	.03	0	.02	0	0	0									
7	.01	.03	.04	.02	.02	.03	0								
8	.01	.01	.10	.06	.01	.01	.10	0							
9	.03	.01	.10	.01	.03	.03	.03	.06	0						
10	.02	.01	.01	.02	.02	.01	0	.03	.01	0					
11	.03	.01	.02	.03	.01	.01	.01	0	.03	.02	0				
12	.03	.01	0	.04	.01	.01	0	.01	.02	.01	.01	0			
13	.04	.04	.06	.03	.01	.03	.14	.11	.01	.01	.02	.04	0		
14	.02	0	.05	.03	.04	.04	.03	0	.06	.01	.10	0	.02	0	
15	.04	.04	.01	0	.01	.02	.04	.04	.03	.01	.02	.01	.05	.05	0

Note. The items are presented in the order of the EA-SI Work Scale.

9.9 Appendix I – Data Transparency Appendix – Study Two

Variables in the Complete Dataset	Poster (STATUS=presented)	MS 1 (STATUS=current)	MS 2 (STATUS=published)	MS 3 (STATUS=planned)
Experienced Appreciation (Colleagues)		X	X	X
Experienced Appreciation (Supervisors)	X	X	X	X
Perceived Stress	X	X		
Global Self-Esteem	X	X		
Work Satisfaction	X	X		X
Life Satisfaction	X	X		
Work Engagement	X	X		X
Emotional Exhaustion	X	X		X
Appreciation at Work Scale		X		
Appreciation single Item (Colleagues)		X		
Appreciation single Item (Supervisors)		X		
Workplace Ostracism		X		
Interpersonal Justice		X		
Environmental Policy Attitude		X		
Social Support		X		
Big Five Inventory				X
Turnover Intention				
Sleep Quality				
Effort-Reward Imbalance				

Note. The abbreviation „MS“ stands for manuscripts planned or written using Study Two’s data. There is no detailed „Data Transparency Appendix“ on Study One’s data since these data were analyzed in the current manuscript with no further use planned.

4.3 Research Objective – Original Empirical Study Two

After validating EA-SI as a construct that incorporates a multitude of different manifestations of appreciation and testing its operationalization and theoretical framework in the first study, in the second original study, (1) a shorter and more time-economic instrument to measure EA-SI will be developed. The second original study strives to (2) replicate the previously attained insights on the SOS theory to counter the well-known replication crisis. The term *replication crisis* refers to the phenomenon of specific results being of limited to no replicability when tested again in independent samples. This phenomenon questions the reliability of psychological insights. Hence, the psychological research community is required to purposefully replicate previous findings empirically consolidating the foundation of psychological knowledge (Open Science Collaboration, 2015). Therefore, in the second study the findings regarding EA-SI and the SOS theory will be tested in another independent sample. Consequently, employees will be again surveyed as appreciation receivers asking them about their colleagues and direct supervisors as appreciators. In addition, the second original study will (3) provide a detailed overview of different understandings and operationalizations of experienced appreciation in scientific literature. EA-SI will be theoretically differentiated from other constructs while clarifying its unique, integrative structure. Moreover, the second original study strives to (4) gain new insights on the relevance of EA-SI for individuals' well-being by investigating its relation to employees' burnout as a potential outcome. The second original study will be led by the following research questions:

Q1: Does the short version of the EA-SI Work Scale confirm the expected
unidimensionality of EA-SI?

Q2: Can EA-SI be measured reliably and validly using the EA-SI Work Scale (short)?

Q3: Is EA-SI related to employees' work engagement and burnout when controlled by
social support?

EXPERIENCED APPRECIATION IN SOCIAL INTERACTIONS

Again, a multi-study design using online-based self-reports will be applied to answer the research questions. First, the short scale will be derived based on the original instrument. To decide which items to choose for the short scale, a combination of various criteria such as factor loadings within confirmatory factor analyses (e.g., Comrey & Lee, 1992), evaluation by naïve and expert judges (e.g., Moosbrugger and Kelava, 2008), and the innovative approach of employing the large language model ChatGPT 4.0 for item selection (Open AI, 2024) will be considered. Subsequently, the EA-SI Work Scale (short) will be tested in a second independent sample, once again characterized by a variety of different industries. To do so, Pearson product-moment correlations (e.g., Kurtz & Mayo, 1978) and hierarchical linear regressions (e.g., Montgomery et al., 2021) will be applied to validate the instrument, replicate the assumptions of the SOS theory, and test the predictive value of EA-SI for employees' work engagement and burnout. Again, the incremental validity of experienced appreciation will be investigated above the influence of social support.

4.4 Original Empirical Study Two

Resch, M., Nagelmann, E. & Bellhäuser, H. (2025). Measuring appreciation made EA-SI –

The development of a short scale to measure experienced appreciation in social interactions at work. *Frontiers in Psychology*, 16.

<https://doi.org/10.3389/fpsyg.2025.1465512>.



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Measuring appreciation made EA-SI-the development of a short scale to measure experienced appreciation in social interactions at work

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Experienced appreciation at work is incongruently defined and measured in the scientific literature. Therefore, this article aims to give an overview of different definitions and measures of experienced appreciation at work to clarify the confusing state of research. Then, the new construct, Experienced Appreciation in Social Interactions (EA-SI) at Work, is introduced to counter the incongruency in defining experienced appreciation at work and to provide a reliable and comparable operationalization of the construct. In a second step, the article aims to develop and validate a short scale to measure EA-SI more time-efficiently. To do so, the instrument is derived from the original EA-SI Work Scale considering confirmatory factor analyses, artificial intelligence, and the evaluation of naïve and expert judges based on a sample of $N = 391$ employees. Subsequently, the EA-SI Work Scale (short) – including $k = 4$ items each for colleagues and supervisors as a source of experienced appreciation – is validated in a second independent sample with $N = 323$ participants. The assumptions of its theoretical framework (the Stress as Offense to Self-theory) and the relations between EA-SI and employee work engagement and burnout were tested to validate the short scale. Additionally, its internal consistency, convergent, and discriminant validity were determined. Social support was added as a control variable to test for EA-SI's incremental predictive value. The results highlight the unidimensional structure of EA-SI and point toward high reliability and validity of the short scale. Conclusively, the limitations and implications of the findings are discussed.

KEYWORDS

appreciation, EA-SI work scale, work engagement, burnout, positive work

1 Introduction

The word “appreciation” describes the recognition and acknowledgment of a value (Schäfer, 2021). Accordingly, there are different focus points on which appreciation can be oriented. For example, appreciation can be felt for one's life circumstances, for other people (Adler, 2002), or one's own body (Avalos et al., 2005). Besides the sensation of feeling appreciation for someone or something, one can also receive appreciation from others and feel valued by them in social interactions (Pfister et al., 2020; Stocker et al., 2010).

As Ashforth and Schinoff (2016) pointed out, the context of work represents one of the most important contexts upon which human identity is built. In line with this, recent findings highlighted the relevance of experienced appreciation for employee well-being, satisfaction,

and motivation. Employees who felt valued by their colleagues and direct supervisors reported higher global self-esteem and lower feelings of stress (Resch and Bellhäuser, 2025; Semmer et al., 2019). The more employees felt appreciated by others, the higher their work satisfaction (Pfister et al., 2020) and general life satisfaction (Resch and Bellhäuser, 2025), as well as their work engagement were (Al-Aali and Ahmed, 2022; Muntz and Dormann, 2020). Furthermore, employees who experienced less appreciation at work felt more emotionally exhausted (Maslach and Leiter, 2017; Resch and Bellhäuser, 2025).

Despite its relevance, appreciation at work is incongruently defined and operationalized and, therefore, has limited comparability between different articles. Appreciation is used synonymously with constructs such as respect (Carstensen et al., 2021; Decker and Van Quaquebeke, 2014), (social) recognition (Schneickert et al., 2019), reward (Bregenzer et al., 2022), or gratitude (Fagley, 2016). Other articles discuss appreciation as a part of social support (Semmer et al., 2019; Sundin et al., 2007). When explicitly defined as appreciation, the theoretical frameworks differ from a single-factor structure (Semmer et al., 2019) over a four-dimensional understanding (Döring-Katerkamp and Rohrmeier, 2016) to a five-dimensional construct definition (White, 2016, 2017).

This article strives to fulfill three objectives. First, a descriptive overview of how appreciation can be defined and measured will be given using instruments recently applied in research. Second, the newly developed construct *Experienced Appreciation in Social Interactions* (EA-SI) and the EA-SI Work Scale (Resch and Bellhäuser, 2025) will be introduced as an alternative to counter the previously described incongruency as it combines different understandings of appreciation in one integrative model based on the well-established Stress as Offense to Self-theory (Semmer et al., 2019). Finally, this article aims to develop a short scale of the EA-SI Work Scale to enable researchers and practitioners to measure the construct more time-economically. To do so, the short scale will be derived from the original instrument in Study One and subsequently validated in the independent sample of Study Two. Please note that whenever the acronym “EA-SI” is used, the underlying construct is addressed, while the instruments to operationalize the construct are named in full length. This differentiation should make it easier to separate the construct from its operationalization.

2 Theory

2.1 Definition and operationalization of experienced appreciation at work—overview

As mentioned above, defining the construct “appreciation” in scientific literature is characterized by incongruency. Resch and Bellhäuser (2025) already pointed toward this issue but omitted to give a more detailed overview regarding the various approaches to understanding appreciation at work. To extend the understanding of the underlying research gap, we will give a guiding overview of how the construct has previously been defined and operationalized in literature. Please note that the following selection is not based on a systematic literature review.

One construct that is used synonymously to address and operationalize appreciation is the construct “respect.” Following van Quaquebeke and Eckloff (2010), respect is defined as “an attitude toward other people [...] that in return engenders in the target a feeling of being appreciated” (p. 345). Respect can be measured using the *Respectful Leadership scale*. The 12 items of the scale are used to measure respect as a one-dimensional construct (van Quaquebeke and Eckloff, 2010). Participants can answer on a five-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). With $\alpha > 0.9$, the scale’s reliability is excellent (Blanz, 2023). Although respect and appreciation are theoretically distinguished by van Quaquebeke and Eckloff (2010) they are measured synonymously and interwoven with each other. The operationalization is limited to supervisors as a source of respect.

Besides respect, “appreciation” is equated with the construct “reward” in scientific literature. In line with this, Bregenzer et al. (2022) subsume appreciation in one of the “six areas of worklife” by Leiter and Maslach (1999). Reward is defined as “collegial or managerial recognition, material compensation, and intrinsic enjoyment of the work” (Bregenzer et al., 2022). Hence, appreciation is not understood as an autonomous construct but associated with reward as a proximal construct to measure it. Following this line of thought, appreciation could be measured using the dimension “reward” within the German version of the *Areas of Worklife Scale* (Brom et al., 2015). The instrument includes a total of six dimensions. Four of the 29 items capture the dimension “reward” on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). With $\alpha > 0.8$, the internal consistency of the subscale is high (Blanz, 2023).

Following Semmer et al. (2019), a third construct that could be synonymously used to cover appreciation is the construct of “social support.” In line with Sundin et al. (2007) and Bregenzer et al. (2022), appreciation could be understood as a subsumed part of social support, which is defined as the “overall levels of helpful social interaction available on the job from both co-workers and supervisors” (Karasek and Theorell, 1990, p. 69). Following this definition, appreciation could be measured with the social support scale by Frese (1989). Five of the 20 items record the perceived social support from colleagues, and five different items survey social support by supervisors. The four-point rating scale ranges from 1 (*not at all*) to 4 (*completely*). The internal consistency is $\alpha > 0.8$ and, therefore, high (Blanz, 2023).

However, Semmer et al. (2019) and Resch and Bellhäuser (2025) pointed out that the construct of experienced appreciation can be theoretically and statistically distinguished from other constructs, such as social support. Therefore, they argue that appreciation should be treated as an autonomous construct.

In line with this understanding, one approach to defining appreciation is the theory of the “five languages of appreciation” by White (2016) including the five dimensions “words of affirmation,” “quality time,” “acts of support,” “material gifts,” and “physical touch.” Theoretically, these dimensions are believed to be unambiguously distinguishable from each other. With the help of the *Motivating by Appreciation Inventory* (MBA Inventory) the languages of appreciation can be measured. As the fifth language did not appear appropriate within the work context, the inventory surveys only the remaining four languages using $k = 15$ items each. A total of 60 statements are compared in duplicates. In 30 comparisons of two statements, respondents select the statement that corresponds most with their preferred language of appreciation (White, 2016). With internal

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consistencies between $\alpha > 0.6$ and $\alpha < 0.8$, the scale's reliability ranges from questionable to acceptable (Blanz, 2023).

Another way to look at appreciation at work is the definition by Döring-Katerkamp and Rohrmeier (2016). Following their understanding, appreciation in the workplace should be a combination of the four distinct facets "respect," "opportunity," "self-efficacy," and "success and recognition." To measure appreciation, the *German Appreciation Index* can be used (Döring-Katerkamp and Rohrmeier, 2016). This instrument is based on a total of $k = 14$ items, which can be answered on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Three items each focus on the dimensions of respect, opportunity, and self-efficacy, while five questions cover the dimension of success and recognition. Three additional questions are implemented to assess experienced appreciation on a global level. With values between $\alpha > 0.7$ and $\alpha < 0.9$, the internal consistency of the instrument is acceptable to high (Blanz, 2023).

Pointing toward the diverging definition and measurement of appreciation, Semmer et al. (2019) assemble appreciation based on the expressions "praise and gratitude," "trust," "responsibility," "support," and "respect." Despite these different clusters, Semmer et al. (2019) understand appreciation as a single-faceted construct in distinction to social support. To measure appreciation, the *Appreciation at Work Scale* (AAWS; Jacobshagen et al., 2008) can be used. Five of the $k = 10$ items focus on colleagues, the remaining five on supervisors as the origin of experienced appreciation. Instead of encompassing both conditional and unconditional manifestations, the items focus solely on conditional expressions of appreciation. The items can be answered on a seven-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). With $\alpha > 0.8$, the instrument's reliability is high (Blanz, 2023).

Based on the assumption that experienced appreciation should be understood as a one-dimensional construct (Jacobshagen et al., 2008; Resch and Bellhäuser, 2025; Semmer et al., 2019), the two single items by Bakker et al. (2007) and Stocker et al. (2019) do represent another way of surveying appreciation. The former measures the appreciation from colleagues on a five-point rating scale from 1 (*almost never*) to 5 (*very often*). The latter focuses on supervisors as a source of experienced appreciation measured on a seven-point rating scale from 1 (*very dissatisfied*) to 7 (*very satisfied*).

In distinction to other definitions, Mettler von Meibom (2007) as well as Schäfer (2021) focus more explicitly on unconditional manifestations of appreciation. In line with their understanding, appreciation should be understood as a loving and benevolent attitude toward others that is shown by unconditionally acknowledging a person's worth as a human being. Although their approach is in line with recent findings pointing out the relevance of unconditional appreciation (Döring-Katerkamp and Rohrmeier, 2016), their definition is limited to theoretical considerations without the attempt to operationalize the construct.

Since this section aims to coherently summarize different approaches to define and measure appreciation, Appendix A provides an overview of the most relevant information and exemplary items.

2.2 Experienced appreciation in social interactions—an integrative approach

To our knowledge, the previous approaches either lack (1) a well-established theoretical framework, (2) an integrative understanding of

appreciation that combines conditional and unconditional manifestations or (3) a robust statistical validation of the assumed construct characteristics.

Considering the outlined definitions, EA-SI aims to combine different understandings of experienced appreciation in one integrative model based on the premises of the *Stress as Offense to Self-theory* (SOS; Semmer et al., 2019). It distinguishes between the *Appreciator*, the person who supposedly sends appreciative signals, and the *Appreciation Receiver*, who feels appreciated. EA-SI puts the feelings of the receiving person in the center of attention. It measures whether the appreciation receiver feels appreciated instead of whether the appreciator intended to send appreciative signals.

An appreciative interaction can be experienced in direct or indirect contact, verbally or non-verbally, and in dyadic or more public interactions (Stocker et al., 2014; Resch and Bellhäuser, 2025). In the work context, colleagues and direct supervisors can be considered sources of experienced appreciation (Stocker et al., 2014).

EA-SI integrates the variety of different behaviors identified as appreciative in the scientific literature in one construct. Döring-Katerkamp and Rohrmeier (2016) pointed out that conditional appreciation is more present in literature than unconditional appreciation. Nonetheless, respondents in the corresponding survey longed the most for precisely this kind of unconditional appreciation regardless of any requirements (Döring-Katerkamp and Rohrmeier, 2016). To recognize these insights, EA-SI integrates both conditional and unconditional expressions of appreciation.

EA-SI is conditionally present when employees feel that their achievements, strengths, and abilities are recognized (Kuoppala et al., 2008; Stocker et al., 2014) and their professional opinions are taken seriously (Stocker et al., 2019). The more trust is placed in them, the stronger the feeling of being appreciated (Elfering et al., 2007). Furthermore, appreciation is higher the more employees receive appropriate material and non-material tokens of acknowledgment for their work (White, 2016).

Focusing on unconditional expressions of EA-SI, the more respondents are treated respectfully (Apostel et al., 2018) and without violence (Rosenberg, 2015), the more they feel appreciated. It is an unconditional expression of EA-SI if employees feel that others are actively listening and showing personal and professional interest (Stocker et al., 2019), are willing to invest time and resources in their well-being (Semmer et al., 2019), and support their development (Siegrist, 2016). Additionally, EA-SI includes the opportunity to emotionally and socially bond with others (Rogers, 2020) and to be part of a community. Conclusively, EA-SI can be described as the integrative combination of conditional and unconditional expressions of a loving and benevolent attitude experienced in social interactions by the Appreciation Receiver (Mettler von Meibom, 2007).

As mentioned above, appreciation can be theoretically distinguished from social support. While social support is described as helpfully interacting with others, appreciation is not limited to helping others but also focuses on acknowledging their worth and performance in all situations of their (work) lives. Following Pfister et al. (2020), social support is present in challenging times while appreciation should be present throughout the highs and lows of people's work reality. This sets EA-SI apart from social support since it describes appreciating a person's value in challenging times as well as recognizing their achievements and strengths in times of success.

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Based on the integrative definition that considers conditional and unconditional manifestations of appreciation, EA-SI targets one relevant aspect other definitions lacked. A second one is the omission of integrating appreciation in a strong theoretical framework. This is why Resch and Bellhäuser (2025) decided to develop EA-SI upon the well-established Stress as Offense to Self-theory (Semmer et al., 2007, 2019).

The SOS assumes that building and maintaining a positive self-esteem represents a basic human need. If one's self-esteem is threatened and the corresponding need is jeopardized, individuals strive to defend it. The endeavor to counteract the attack on the self-esteem is accompanied by an increased feeling of stress which is associated with various negative outcomes. Semmer et al. (2019) defined *boosts* and *threats* that influence the self-esteem. Boosts contribute to an increase in positive self-esteem, while threats endanger it. In line with this, employees who felt appreciated at work (boost) reported higher self-esteem and lower stress (Semmer et al., 2019).

Although other theories from organizational psychology, such as the well-established *Conservation of Resources Theory* (COR; Hobfoll et al., 2016), *Job Demands-Resources Theory* (Bakker et al., 2014), or the *Self-Determination Theory* (SDT; Ryan and Deci, 2018) could have been considered the theoretical foundation, we decided to build EA-SI upon the SOS theory.

While the COR distinguishes three categories of resources that must be protected to avoid stress, the JD-R combines resources and demands in a complex interplay with each other. The SDT explicitly focuses on the three human needs “autonomy,” “competence,” and “relatedness” and different outcomes varying with the fulfillment of these needs.

This is where the SOS theory—centered around the individual's self-esteem—differs from other theories. In line with the theoretical discussion by Semmer et al. (2019), we do not understand the human self-esteem as one of numerous outcomes varying with the complex interplay at work but, on the contrary, as a central construct explaining the mechanism of action behind these interplays. Understanding the lack of appreciation as a severe attack on the self-esteem, we decided to build EA-SI on the SOS theory to recognize the assumed role of appreciation in fulfilling the underlying human need.

For a more detailed theoretical discussion of the SOS theory in contrast to existing theories, see Semmer et al. (2019). By embedding an integratively defined and statistically validated understanding of appreciation—in terms of EA-SI—into the well-established SOS theory, we adhere to the implications by Semmer et al. (2019) that appreciation should be further investigated as an autonomous construct.

The integration of EA-SI in the framework of the SOS theory has been previously tested by Resch and Bellhäuser (2025) in a multi-study design. The results strengthened the assumptions of the SOS theory and the theoretical foundation of the model since EA-SI was positively related to self-esteem, while stress and self-esteem were negatively related to each other. Extending the SOS theory, the results pointed toward direct relations between EA-SI and stress as well as between EA-SI and employee motivation, well-being, and satisfaction (Resch and Bellhäuser, 2025). Exceeding the original SOS theory, these relations were true for employees' global stress perception and global self-esteem, indicating spillover dynamics between different areas of employees' lives.

As an extension of existing measures Resch and Bellhäuser (2025) developed the integrative EA-SI Work Scale to operationalize EA-SI and counteract the described incongruence in defining and measuring experienced appreciation at work. The instrument encompasses two scales with $k = 15$ items for colleagues and direct supervisors each. The items can be answered on a 10-point Likert scale from 1 (*strongly disagree*) to 10 (*strongly agree*). The scale also includes the fallback option “I cannot answer this.” With an internal consistency of $\alpha > 0.9$ and a retest-reliability of $\alpha > 0.8$, the reliability for both sources of experienced appreciation is high to excellent (Blanz, 2023). The items are depicted in detail in Appendices B, C.

The instrument was validated in two independent samples with $N = 231$ and $N = 391$ participants. The one-dimensional structure of EA-SI was not solely derived theoretically but statistically tested in exploratory and confirmatory factor analyses (Resch and Bellhäuser, 2025). The assumed relations between EA-SI, employee stress, self-esteem, satisfaction, and emotional exhaustion were found in both samples. The high heterogeneity of participating organizations and branches increased the external validity of the findings. However, regardless of the strengths and practical benefits of the EA-SI Work Scale, the high number of items, high internal consistency, and high correlations with convergent measures require the development of a short scale to facilitate a more time-efficient measurement of EA-SI.

Despite the various expressions combined in the construct, EA-SI can be understood as a one-dimensional construct. Resch and Bellhäuser (2025) highlighted in their multi-study validation that exploratory and confirmatory factor analyses indicated a one-factor solution. Moreover, EA-SI was statistically distinguishable from social support, incrementally predicting employee motivation, satisfaction, and emotional exhaustion. Figure 1 sums up the EA-SI model.

2.3 Research questions and hypotheses

Since EA-SI has already been investigated in two independent samples with the rather time-consuming EA-SI Work Scale, we will develop a more time-economic and low-threshold applicable short scale. To address the described research gap, this article strives to answer three research questions. To increase the article's stringency, order and wording of the research questions differ from preregistration.

Q1: Does the short version of the EA-SI Work Scale confirm the expected unidimensionality of EA-SI?

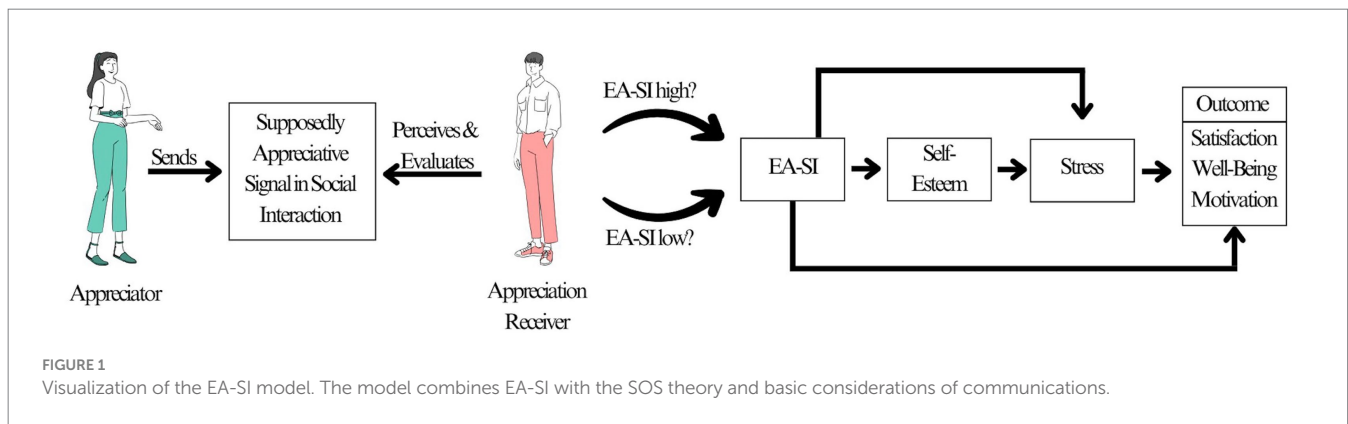
Q2: Can EA-SI be measured reliably and validly using the EA-SI Work Scale (short)?

Q3: Is EA-SI related to employees' work engagement and burnout when controlled by social support?

The following hypotheses, H1 to H3, are derived to replicate the premises of the SOS to test the construct validity of the short scale. The hypothesis supplement “a” refers to colleagues, while supplement “b” refers to direct supervisors as a source of appreciation.

H1a/b: The more employees feel appreciated, the higher their self-esteem.

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H2: The higher employees' self-esteem, the lower their perceived stress.

H3a/b: The more employees feel appreciated, the lower their perceived stress.

As deduced, experienced appreciation—regardless of the incongruence in measuring it—was related to employee work engagement, satisfaction, and well-being (Resch and Bellhäuser, 2025). Emotional exhaustion was used in previous studies to measure well-being. Based on these findings, we assume that EA-SI does not solely relate to one facet of burnout but to the global construct with its three facets “emotional exhaustion,” “loss of meaning,” and “reduced sense of efficacy” (Maslach and Leiter, 2017). Hypotheses H4 and H5 are defined to investigate the criterion validity of the EA-SI Work Scale (short). Social support from colleagues and direct supervisors is implemented as a control variable in these hypotheses to replicate the assumed incremental validity of EA-SI.

H4a/b: The more employees feel appreciated, the higher their work engagement.

H5a/b: The more employees feel appreciated, the lower their burnout.

To answer the deduced research questions and hypotheses, we investigated two independent samples in a multi-study design. Study One was used to develop the EA-SI Work Scale (short) based on the original long version of the instrument. Subsequently, we used Study Two to validate the newly developed EA-SI Work Scale (short) in a second, independent sample.

3 Study One

3.1 Method—Study One

3.1.1 Design and sample

Study One results from the survey conducted by Resch and Bellhäuser (2025) to validate the original EA-SI Work Scale. The data was surveyed applying a cross-sectional field study design. It was conducted using online self-reports via the service SoSci Survey (Leiner, 2024) available on internal servers of Johannes Gutenberg

University Mainz. Small and medium-sized companies across Germany were acquired using Email, flyers, telephone calls, and on-site meetings. The survey initially included two time points, but solely the first measurement point was used to develop the short scale. Data collection took place in the fall of 2022.

There were a total of five inclusion criteria for participation in the survey. Participants had to (1) be between 18 and 79 years old, (2) work at least 8 h a week, and (3) have regular contact with at least one colleague and direct supervisor. In addition, only those participants who (4) completed the questionnaire to the last page and (5) stated at the end that they had answered it conscientiously and concentrated were considered.

This resulted in a total sample of $N = 391$ employees. $n = 260$ (66.5%) were female, $n = 129$ (33%) were male, and $n = 2$ (0.5%) reported their gender to be non-binary. On average, participants were 34.04 years old ($SD = 13.67$). The youngest participant was 18, while the oldest one was 71 years old. Overall, 51% of respondents were in permanent employment, 34.5% were employed temporarily, 12.8% worked in the public sector, and 1.7% worked as freelancers. The sample is characterized by a highly heterogeneous composition of different professional activities. In addition to doctors, participants included teachers, graphic designers, cooks, service personnel, architects, caregivers, and various other branches.

3.1.2 Instruments

To measure experienced appreciation, the previously described EA-SI Work Scale by Resch and Bellhäuser (2025) was used. In the instructions, participants were asked to remember the last 3 months when answering the questionnaire. In addition to experienced appreciation, various other constructs were surveyed to investigate employee well-being, satisfaction, and motivation. However, these instruments are of no further relevance to deriving the EA-SI Work Scale (short).

3.1.3 Transparency and openness

All relevant instruments and inclusion criteria are described. The processed data from which the EA-SI Work Scale (short) was derived can be accessed publicly via osf.io using the link https://osf.io/hyk2m/?view_only=21c425cdcf294ad39e399a7b554c4d08. As the data analysis was performed with JASP 0.18.3 (JASP Team, 2024), no code was published. Due to the fallback option within the EA-SI Work Scale, missing values occurred. Since the proportion of missing values (4.4%) was below the recommended threshold of 10%, missing values

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were estimated using mean imputation (Schumacker, 2015; Watkins, 2018). The research questions and hypotheses were preregistered using aspredicted.org¹.

3.1.4 Statistical procedure—development of the EA-SI work scale (short)

To derive the short scale and analyze the construct's dimensional structure, the original EA-SI Work Scale was analyzed using confirmatory factor analyses for both sources. To determine the factor structure of the original scale, the maximum likelihood method with 5,000 bootstrap samples and standardized factor loadings was applied. Since the factorial structure of the original scale has already been tested by Resch and Bellhäuser (2025), the data in Study One was solely used to derive the short scale.

To do so, we defined specific criteria to guarantee a comprehensible and reliable item selection. In the first step, (1) only the items with an “excellent” factor loading ≥ 0.71 (Comrey and Lee, 1992) were selected for the short scale. Based on the original scale's length of $k = 15$ items for each source of appreciation, the aim was to reduce the short scale to a maximum of one-third of its original length. Hence, (2) the maximum number of items in the more time-efficient short scale should not exceed $k = 5$. We then (3) implemented a data-driven interim phase of item pre-selection using artificial intelligence (AI) to perform a first draw of items based on the construct definition and the previously defined criteria. Using a specific prompt, we asked ChatGPT 4.0 (Open AI, 2024) to select a restricted number of items that survived confirmatory analysis. Within several runs, the AI selected different constellations for both sources of appreciation. In line with the guidelines for developing instruments with high psychometric quality (Moosbrugger and Kelava, 2008), the remaining items were also presented to naïve and expert judges. Those judges evaluated the items' content validity, considering the construct's definition and the defined selection criteria. The instruction and the specific selection criteria for AI's and experts' decisions can be found in Appendix D. Finally, the authors combined all information to decide which items to include into the short scale. Please note that the factor structure of the original scale has been previously tested by Resch and Bellhäuser (2025) and that these analyses are reported again for comprehensibility and integrity in Study One.

3.2 Results

3.2.1 Factor structure—original EA-SI work scale

Considering all indices and the misfit plots, the results indicated a good fit for the single-factor solution for colleagues and direct supervisors. The parameters of the analyses are shown in Table 1. The misfit plots are depicted in Appendix E.

3.2.2 Item selection—EA-SI work scale (short)

The items for the short scale were selected according to the defined criteria. First, all items with a factor loading < 0.71 were excluded. This step left $k = 9$ items for both sources.

TABLE 1 Confirmatory factor analyses – original EA-SI work scale.

Indices	Colleagues	Supervisors
χ^2	180.65	231.66
df	90	90
p	< 0.001	< 0.001
CFI	0.97	0.97
RMSEA	0.05	0.06
90% CI	[0.04; 0.06]	[0.05; 0.07]
SRMR	0.03	0.03

In addition to the fit indices, the 90% confidence interval of the RMSEA (90% CI), the significance value of the χ^2 test (p), and the degrees of freedom (df) are reported.

The remaining nine items—separated by source—were then fed into the AI. The AI made several pre-selections based on the prompt using the construct definition to fulfill the task of reducing the instrument to one-third of its original length. Simultaneously, $n = 18$ naïve and $n = 10$ expert judges assessed the items. Combining the factor analyses, AI's pre-selection, and judges' assessment, we selected $k = 4$ items. The same items with the identifiers 10, 5, 2, and 11 were selected for colleagues and direct supervisors. Table 2 summarizes the factor loadings of all items of the original EA-SI Work Scale.

The short scale was highly correlated with the original EA-SI Work Scale (Cohen, 1988). For colleagues, the correlation was $r = 0.92$. For direct supervisors, both instruments correlated with $r = 0.95$. For a detailed list of the items included in the EA-SI Work Scale (short), see Appendices F, G.

3.2.3 Internal consistency

The internal consistency was excellent for the original EA-SI Work Scale $\alpha = 0.90$ (colleagues), $\alpha = 0.93$ (direct supervisors), as well as for the EA-SI Work Scale (short) $\alpha = 0.89$ (colleagues), $\alpha = 0.94$ (direct supervisors; Blanz, 2023).

4 Study Two

After developing the EA-SI Work Scale (short), the instrument was validated in a second, independent sample. The following section will outline Study Two's design, sample, instruments, and statistical analyses.

4.1 Method—Study Two

4.1.1 Design and sample

The second sample was collected using a cross-sectional field study design to validate the short scale. In total, $N = 323$ participants were surveyed. The inclusion criteria, acquisition strategy, and method of online-based self-reports equal Study One. Data collection took place in the fall of 2023.

Of the participants, $n = 238$ were female, $n = 83$ were male, and $n = 1$ were non-binary. The age ranged from 18 to 64 years ($M = 32$, $SD = 12.24$). Of all respondents, 57.3% were in permanent employment, 32.2% were in temporary employment, 8.4% were civil servants, and 2.2% worked as freelancers. The sample was characterized by high job heterogeneity. Participants include tax

¹ https://aspredicted.org/LM6_7C5

EA-SI WORK SCALE (SHORT)

TABLE 2 Factor loadings—original EA-SI work scale.

Colleagues			Supervisors		
Factor	Item	Loading	Factor	Item	Loading
Factor 1	EA-SIc_10	0.86	Factor 1	EA-SIc_10	0.92
	EA-SIc_5	0.85		EA-SIc_5	0.92
	EA-SIc_2	0.83		EA-SIc_12	0.91
	EA-SIc_6	0.81		EA-SIc_2	0.90
	EA-SIc_11	0.77		EA-SIc_6	0.87
	EA-SIc_14	0.74		EA-SIc_11	0.85
	EA-SIc_4	0.72		EA-SIc_15	0.79
	EA-SIc_8	0.71		EA-SIc_1	0.78
	EA-SIc_1	0.71		EA-SIc_4	0.73
	EA-SIc_12	0.58		EA-SIc_14	0.66
	EA-SIc_15	0.54		EA-SIc_13	0.61
	EA-SIc_13	0.49		EA-SIc_8	0.58
	EA-SIc_3	0.44		EA-SIc_3	0.39
	EA-SIc_7	0.27		EA-SIc_9	0.34
	EA-SIc_9	0.27		EA-SIc_7	0.30

The left section shows the standardized factor loadings for colleagues, while the right section shows them for direct supervisors.

consultants, police officers, physiotherapists, leading personnel, logopaedists, service personnel, laboratory technicians, church personnel, and teachers.

4.1.2 Instruments

EA-SI was measured using the newly developed EA-SI Work Scale (short). In line with the original EA-SI work Scale, a ten-point Likert scale was used. Since appreciation should be a highly nuanced experience, we decided to provide respondents with a scale that mirrors the needed degree of distinction based on its highly granulated answer options (Dawes, 2008). Moreover, the lack of a neutral answer option should help respondents to decide whether they would rather agree or disagree with a specific statement instead of falling for neutrality (Dawes, 2008). Therefore, the items—four for colleagues and four for direct supervisors as a source of appreciation—could be rated from 1 (*strongly disagree*) to 10 (*strongly agree*). If the items did not apply to their work, participants could use the fallback option “I cannot answer this.” Participants were instructed to remember the last 3 months when answering the questionnaire.

To determine the short scale’s convergent validity, we investigated its relation with the previously described single items to measure appreciation by direct supervisors (Stocker et al., 2019) and colleagues (Bakker et al., 2007). The first single item ranged from 1 (*almost never*) to 5 (*very often*). The second item could be answered on a seven-point rating scale from 1 (*very dissatisfied*) to 7 (*very satisfied*).

To test for discriminant validity, we used four established items to survey participants’ attitudes toward the government’s environmental policy (Ferris et al., 2008). The question for all four items was, “How do you rate our government’s environmental policy?” The items were answered on a five-point dyadic differential from 1 (*good/ wise/ helpful/ useful*) to 5 (*bad/dumb/damaging/useless*).

Furthermore, employees’ global self-esteem was measured using the German version of the *Rosenberg Self-Esteem Scale* (von Collani

and Herzberg, 2003). The scale contained 10 items on a six-point Likert scale from 1 (*not at all*) to 6 (*completely*). An example item is “Overall, I am satisfied with myself.”

As an additional convergent measure, we surveyed *perceived stress* with the German version of the *Perceived Stress Questionnaire* (Fliege et al., 2001) using the short version by Umucu et al. (2018). The eight items could be answered on a four-point rating scale from 1 (*almost never*) to 4 (*most of the time*). One item read: “You have the feeling that too many demands are asked of you.”

Work engagement was measured using the German version of the Utrecht Work Engagement Scale-9 by Schaufeli et al. (2006). The scale has nine items that can be answered on a seven-point rating scale from 1 (*never*) to 7 (*every day*). An example item is “I am full of exuberant energy at work.”

To assess *burnout*, the short version of the Maslach Burnout Inventory for Students (MBI-SS KV) by Würfel et al. (2015) was used. For Study Two, the items were adapted to fit the work context. For example, the item “My studies make me feel drained” was changed to “My work makes me feel drained.” The scale covers all three dimensions of burnout with three items each. The items were answered on a seven-point rating scale from 1 (*never*) to 7 (*every day*).

Social support was implemented as a control variable to analyze the incremental validity of the EA-SI Work Scale (short). To do so, we used the previously described *Social Support Scale* by Frese (1989).

In addition to these instruments, demographic data was collected, including gender, age, educational qualification, current professional activity, student status, contractually agreed and actual working hours, and job title. Moreover, the turnover intention was collected. This measure is of no interest to this article.

4.1.3 Transparency and openness

We described all instruments and the inclusion criteria of Study Two. The data of the validation of the EA-SI Work Scale

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(short) is publicly available via [osf.io](https://aspredicted.org/bwdr-pwng.pdf) using the link <https://aspredicted.org/bwdr-pwng.pdf>. The data were analyzed using JASP 0.18.3 (JASP Team, 2024), which is why no code was published. The fallback option in the EA-SI Work Scale (short) resulted in missing values. The proportion of missing data (0.55%) was less than 10%, so missing values were imputed by mean imputation (Schumacker, 2015; Watkins, 2018). The research questions and the hypotheses of this article were preregistered at aspredicted.org (see footnote 1). While the three sub-facets of burnout were listed separately in the pre-registration, we decided to examine burnout as a global construct for reasons of stringency. Moreover, we decided to change the research questions in terms of wording but not in terms of content to enhance the stringency of the article in line with the review process. Please note that in the original raw data, there were $k = 7$ items for each source of EA-SI as the survey was carried out as part of a Master's thesis that made use of these items. Nonetheless, for the sake of comprehensibility, the processed data includes the described EA-SI Work Scale (short) with $k = 4$ items only. All following analyses are built upon the uploaded scale and constructs.

4.1.4 Statistical procedure—validation of the EA-SI work scale (short)

In the first step, the aim was to replicate the assumed one-dimensional structure of EA-SI in Study Two. To do so, we conducted confirmatory factor analyses using the maximum likelihood rotation with 5,000 bootstrap samples.

The χ^2 -test was computed to assess the overall model fit. A significant χ^2 -Test points toward a low model fit (Hu and Bentler, 1999; Xia and Yang, 2019). However, when interpreting χ^2 , it should be noted that the risk of a β -error – the erroneous rejection of a suitable model – increases with sample sizes above $N = 200$ (Bergh, 2015; Bühner, 2021; Yuki et al., 2002).

Consequently, Hu and Bentler (1999) recommended considering additional parameters when determining the model fit. For this reason, the indices *Comparative Fit Index* (CFI), *Root Mean Square Error of Approximation* (RMSEA), and *Standardised Root Mean Square Residual* (SRMR) were calculated to determine the fit of the one-dimensional solution. These indices are less sensitive to the sample size (Bühner, 2021). Values of RMSEA < 0.08 (Awang, 2012), SRMR < 0.08 (Byrne, 2013), and CFI > 0.96 (Hu and Bentler, 1999) indicate a good fit. While the RMSEA is sensitive to the number of degrees of freedom—erroneously rejecting fitting models with decreasing degrees of freedom (Chen et al., 2008; MacCallum et al., 1996)—the CFI and SRMR are robust against sample size and degrees of freedom.

As recommended by Kenny et al. (2015), in addition to the χ^2 -test, the misfit plots were calculated to determine the global fit of the model. These plots test the dyadic error variance between the individual items of the scale. High values indicate a low model fit (Kenny et al., 2015). Rogers (2024) suggested that a low “misfit” is indicated if the majority of values lies below $r = 0.10$.

In the second step, Pearson product–moment correlations were calculated to determine the short scale's construct validity. Convergent validity was indicated when the short scale correlated positively with theoretically similar constructs and negatively with distinct constructs. Discriminant validity was indicated

when EA-SI was not correlated with discriminant measures Döring and Bortz, 2016.

Finally, the criterion validity of the short scale was analyzed. Pearson product–moment correlations were used to replicate the relations assumed based on the SOS. To test for EA-SI's incremental validity, hierarchical regression analyses were conducted using social support as a control variable. First, social support was included in the model, and then EA-SI was included as a predictor. Participants' work engagement and burnout served as criteria. The significance level for all analyses was $p < 0.05$ (Fisher, 1997).

4.2 Results

4.2.1 Factorial validity—EA-SI work scale (short)

Confirmatory factor analyses were calculated using the four selected items of the short scale separated by colleagues and direct supervisors as sources of experienced appreciation. The χ^2 -test was not significant for colleagues, indicating a good model fit. For direct supervisors, however, the χ^2 -test was significant. In contrast, the additionally computed misfit plots indicated an excellent model fit with $r < 0.10$ for all items and both sources. CFI and SRMR supported this assumption of an excellent fit of the one-dimensional solution. The RMSEA provided ambiguous results. Table 3 summarizes the results of the CFA. The misfit Plots are depicted in Appendix H.

4.2.2 Construct validity—EA-SI work scale (short)

As expected, the short scale was positively related to the convergent single item for colleagues ($r = 0.72^{**}$, $p < 0.001$) and direct supervisors ($r = 0.88^{**}$, $p < 0.001$). There was no significant correlation between EA-SI and employees' attitudes toward environmental politics (colleagues: $r = 0.07$, $p = 0.211$; direct supervisors: $r = -0.05$, $p = 0.375$), supporting the discriminant validity of the short scale. Consequently, the results support the construct validity of the EA-SI Work Scale (short).

4.2.3 Criterion validity—EA-SI work scale (short)

In line with the hypotheses, employees' self-esteem was positively related to experienced appreciation from colleagues $r = 0.32^{**}$, $p < 0.001$, and direct supervisors $r = 0.25^{**}$, $p < 0.001$. Employees who felt less appreciated by their colleagues and direct supervisors reported higher levels of stress (colleagues $r = -0.33^{**}$, $p < 0.001$; direct supervisors $r = -0.24^{**}$, $p < 0.001$). Self-esteem was negatively related

TABLE 3 Confirmatory factor analysis – EA-SI work scale (short).

Parameters	Colleagues	Direct supervisors
χ^2	5.09	20.76
df	2	2
p	0.078	< 0.001
CFI	0.99	0.99
RMSEA	0.07	0.17
90% CI	[0.00; 0.15]	[0.11; 0.24]
SRMR	0.01	0.01

In addition to the fit indices, the 90% confidence interval of the RMSEA (90% CI), the significance value of the χ^2 test (p), and the degrees of freedom (df) are reported.

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to employee stress perception $r = -0.48^{**}$, $p < 0.001$. Therefore, the assumptions of the SOS could be replicated, supporting the hypotheses one to three. A detailed depiction of the internal consistency, mean, standard deviation, range, and inter-correlations of all constructs can be found in [Appendix I](#).

In the second step, linear hierarchical regressions were conducted using social support and EA-SI as predictors. As expected, EA-SI from colleagues predicted higher work engagement ($\beta = 0.41$, $t = 6.33$, $p < 0.001$) above social support ($\beta = -0.01$, $t = -0.18$, $p = 0.860$) with $R^2 = 0.16$, $F(2,320) = 30.88$, $p < 0.001$. Experienced appreciation from direct supervisors did also incrementally contributed to the prediction of work engagement ($\beta = 0.33$, $t = 4.13$, $p < 0.001$) after social support was added ($\beta = 0.05$, $t = 0.57$, $p = 0.57$), $R^2 = 0.14$, $F(2,320) = 25.29$, $p < 0.001$.

In line with the hypotheses, EA-SI predicted burnout beyond social support. The more employees felt appreciated by their colleagues, the lower their burnout ($\beta = -0.32$, $t = -4.92$, $p < 0.001$), above social support ($\beta = -0.08$, $t = -1.24$, $p = 0.215$), $R^2 = 0.14$, $F(2,320) = 26.47$, $p < 0.001$. The higher EA-SI by direct supervisors the lower employee burnout ($\beta = -0.28$, $t = -3.58$, $p < 0.001$) beyond social support ($\beta = -0.19$, $t = -2.52$, $p = 0.012$), with $R^2 = 0.19$, $F(2,320) = 39.53$, $p < 0.001$. Hence, the findings did support hypotheses four and five.

5 Discussion

This article pointed toward the incongruity in understanding appreciation, gave a detailed overview of how appreciation is defined and measured in literature, and introduced the construct EA-SI as an integrative alternative. In addition, this article aimed to (1) test the unidimensional structure of EA-SI based on the EA-SI Work Scale (short), (2) validate the EA-SI Work Scale (short) while replicating the assumptions of the SOS theory, and (3) investigate the role of appreciation for employee work engagement and burnout above the influence of social support. The following section will discuss the results of Study One and Study Two against theory and previous empirical findings. The article's limitations will be critically reviewed, and implications for future research and practical use will be derived.

5.1 Internal consistency

The internal consistency of the short scale was $\alpha = 0.88$ for colleagues and $\alpha = 0.96$ for supervisors. Therefore, its reliability can be evaluated as high to excellent ([Blanz, 2023](#)).

5.2 Factorial validity

Using two independent samples, the short scale was developed based on the original EA-SI Work Scale and then validated in the second sample. In the first sample, the χ^2 -test was significant for colleagues and direct supervisors. In the second sample, the χ^2 -test indicated a good fit of the single-factor model for colleagues but not for direct supervisors.

The RMSEA indicated an acceptable to good fit for the original EA-SI Work Scale. In Study Two, the RMSEA supported the one-dimensional structure for colleagues but not for direct supervisors ([Hu and Bentler, 1999](#)). When interpreting the RMSEA, it must be considered that Study One and Study Two differed substantially regarding their degrees of freedom. The lower the degrees of freedom, the higher the tendency of the RMSEA to reject fitting models ([Kenny et al., 2015](#); [MacCallum et al., 1996](#)).

In contrast, the CFI and SRMR suggested an excellent fit of the one-dimensional solution for colleagues and direct supervisors in both studies ([Hu and Bentler, 1999](#)). The misfit plots also pointed toward a good to excellent fit of the overall single-factorial model for colleagues and direct supervisors ([Rogers, 2024](#)).

Considering our findings and the limitations of the tested parameters, the one-factorial solution is supported in both studies. Thus, the first research question (Q1) can be answered: Using the EA-SI Work Scale (short) the unidimensional structure already found for the long version was strengthened.

5.3 Construct validity

EA-SI was positively related to both single items to measure appreciation. In turn, the EA-SI Work Scale (short) was unrelated to employees' political opinions. Hence, the results of the Pearson product-moment correlations point toward the short scale's convergent and discriminant validity.

5.4 Criterion validity

The more employees felt appreciated by their colleagues and direct supervisors, the higher their self-esteem and the lower their perceived stress. The higher employees' self-esteem, the lower their perception of stress. Therefore, the results of Study Two supported hypotheses one to three for both sources of appreciation. Hence, the presumptions of the SOS theory and the expected relations were replicable in an independent sample.

5.4.1 Incremental validity

As expected, higher levels of EA-SI were related to higher employee work engagement and lower burnout. This was true for colleagues and direct supervisors as sources of experienced appreciation. In all hierarchical regression analyses, EA-SI predicted the criteria above social support. Moreover, in most analyses, EA-SI remained the only significant predictor, while social support did not provide an incremental contribution that exceeded the predictive value of experienced appreciation. The explained variance was moderate, varying between $R^2 = 0.14$ and $R^2 = 0.19$ ([Cohen, 1988](#)). Accordingly, hypotheses four and five can be accepted.

Considering the short scale's content, construct, and criterion validity as well as its excellent internal consistency, we can answer the second research question (Q2): The construct "Experienced Appreciation in Social Interactions" can be reliably and validly measured using the newly developed EA-SI Work Scale (short).

Moreover, EA-SI predicted employees' work engagement and burnout beyond social support. These findings point toward the relevance of appreciation for employee burnout and work engagement.

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Therefore, research question three (Q3) can be answered. The results strengthen the approach to understand experienced appreciation as an autonomous construct that is distinguishable from other constructs such as social support. Since, in most of the analyses, social support was ruled out as a predictor after EA-SI was added, the question is raised whether social support should be understood as an expression of appreciation instead of vice versa.

5.5 Limitations and theoretical implications

Besides the outlined strengths, some limitations should be addressed, raising new questions that cannot be answered within the scope of this article. First, it should be noted that the validation of the EA-SI Work Scale (short) is limited to cross-sectional self-reports. Future research should analyze EA-SI using different designs to increase the validity of the construct. For example, observation studies and qualitative surveys could be conducted to increase the ecological validity. To increase the internal validity, experiments could be designed to identify specific markers (e.g., facial expressions, gestures, statements) that are perceived as indicators of appreciative behavior.

Although the findings support the construct definition and the theoretical assumptions of the SOS, the different parts of the model were analyzed separately. Diary studies with time-lagged panel data using multi-level analyses and mediated mediation analyses should be conducted to better understand EA-SI's mechanism of action and validate the assumed direction of the relations within the EA-SI model.

Considering the RMSEA's contradictory results, the factorial structure of EA-SI—even if confirmed in different independent samples—should be investigated in samples with more degrees of freedom or participants. Besides the small number of degrees of freedom, there is an uneven distribution of gender and terms of employment. Future research should examine the replicability of the results in samples with various gender ratios and more widely distributed employment relationships.

In addition, using the data-based pre-selection of items by the AI “ChatGPT” as a decisional criterion in scale construction represents an innovative approach. Nevertheless, the suitability of AI within item selection must be further investigated.

Across different studies and based on the results of the current article, the role of experienced appreciation for employee satisfaction, motivation, and well-being implies the development of training programs to foster experienced appreciation at work intentionally. However, to systematically evaluate the effectiveness of such training programs, the scale's sensitivity to change and the construct's short-term adaptability must be evaluated in longitudinal designs.

The introductory summary strives to give a fundamental overview of construct definitions and operationalizations of experienced appreciation to clarify the confusing multitude of approaches in the scientific literature. Nonetheless, this article neither represents a systematic review nor a meta-analysis. Future research should systematically entangle the current research landscape around experienced appreciation to enable a more criteria-based clarification of the current state of research around experienced appreciation.

The EA-SI model is based on fundamental assumptions of interpersonal communication. Assuming that (1) the Appreciator and the Appreciation Receiver cannot not communicate at any time

(Watzlawick et al., 2016) and that (2) every supposedly appreciative signal must be interpreted by the Appreciation Receiver (Schulz von Thun, 1981) the question arises how specific attitudes and personality traits of the receiver influence EA-SI. Hence, future research should investigate the influence of such moderator variables on the relations between EA-SI and dependent variables.

Based on the findings by Ashforth and Schinoff (2016) and Oyserman et al. (2012), EA-SI was first validated at work due to the identity-shaping relevance of this life area. Nevertheless, EA-SI is not limited to the work context theoretically. Following its definition, EA-SI describes the appreciation individuals experience when interacting with others regardless of the context. Accordingly, current findings indicate the relevance of experiencing appreciation in other areas of individuals' lives.

For example, Carstensen et al. (2021) showed that students who felt appreciated by their lecturers were more satisfied, more enthusiastic, and less emotionally exhausted in their studies. An appreciative relationship between teachers and students is not only associated with a positive cognitive development of the students (Vandenbroucke et al., 2018) but also with less emotional exhaustion and increased enthusiasm on teachers' side (Cui, 2022). Moreover, experienced appreciation also matters in close relationships. The more participants in romantic relationships felt appreciated by their partner, the more emotionally attentive they acted, the more willing they were to respond to their partner's needs, and the less they were willing to end their relationship (Gordon et al., 2012; Gordon and Diamond, 2023).

Nonetheless, these findings are based on incongruent definitions and operationalizations of the construct experienced appreciation. Therefore, the EA-SI Work Scale (short) should be adapted to congruently and comparably examine Experienced Appreciation in Social Interactions in other types of relationships. In addition, the EA-SI Work Scale (short) has been validated in two samples with German employees. Hence, besides the transfer to other types of relationships, the scale's validation for other languages and cultures is pending.

This article highlights that the constructs EA-SI and social support are distinguishable from each other. This contradicts the understanding of appreciation as a part of social support. Nonetheless, our work is limited to social support and does not focus on other constructs with which appreciation is intermingled. Future research should strive to investigate and entangle supposedly intertwined constructs to clarify them theoretically and statistically.

5.6 Practical implications

The EA-SI Work Scale (short) was developed as a time-efficient instrument to operationalize experienced appreciation. This valid and reliable alternative to the original EA-SI Work Scale is primarily intended for scientific purposes. The short scale can be used to analyze experienced appreciation as a theoretically elaborated and statistically validated construct that can be compared between different studies. At the same time, the results did not solely highlight the validity of the short scale but also the practical relevance of EA-SI.

Consequently, in addition to the original EA-SI Work Scale, the comparatively time-economic short scale can be used in organizations to measure whether employees feel appreciated by their colleagues and direct supervisors. The scale's evaluation is

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designed to be comprehensible and easily applicable. Therefore, employees' answers will be aggregated in one (mean) value. Depending on the application area and the issue, organizations must decide whether to use the more information-rich EA-SI Work Scale or the shorter version.

The results can then be used to identify areas of development within the organization. Additionally, the single items of the scale can be interpreted descriptively to identify specific expressions of appreciation that are perceived as poorly expressed. By focusing on these individual expressions of experienced appreciation, the scale offers the opportunity for *Appreciators* and *Appreciation Receivers* to reflect on appreciation. Appreciators can reflect on how they can express appreciation – where missing – less ambiguously and more frequently. Appreciation Receivers could identify their preferences regarding appreciation, learn how to communicate their needs, and become more attentive to certain expressions of experienced appreciation.

However, to achieve these benefits, training programs must be developed based on the EA-SI Work Scale (short), which guide employees through the reflection process and enable them to interpret their results and derive implications from them. Applying the theoretical model of Experienced Appreciation in Social Interactions, we suggest not solely training the Appreciator but also the Appreciation Receiver. However, such programs are still pending. Therefore, we invite science and industry to collaborate in engineering and evaluating training programs to foster an appreciative, positive culture at work built on mindful interaction.

6 Conclusion

By pointing out different ways to understand experienced appreciation, this article provides an orienting overview that other works omitted to give. The results of this article point toward EA-SI as a reliable, valid, and unidimensional alternative to the described incongruency in literature. The theoretical assumptions of the SOS theory could be replicated using Study Two as an independent sample. With the development of the EA-SI Work Scale (short), this article contributes to measuring experienced appreciation more time-economically and comparably.

The construct's definition and the assumed single-dimensional structure were deduced from the literature and investigated empirically. The presumptions of the SOS theory as a foundation of EA-SI were not taken for granted but were statistically investigated to counter the replication crisis (Open Science Collaboration, 2015). The role of experienced appreciation from colleagues and direct supervisors regarding employee motivation and well-being was clarified further.

The branch heterogeneity and professional diversity in both samples suggest high generalizability of the results. Therefore, we expect our work and the short scale to apply to various contexts, leading to a more consistent definition and comparable analyses of experienced appreciation at work.

Nonetheless, our research came across several limitations, producing new questions. Future research should target these limitations to further test and develop the understanding and operationalization of the construct "Experienced Appreciation in Social Interactions."

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: https://osf.io/hyk2m/?view_only=21c425cdcf294ad39e399a7b554c4d08.

Ethics statement

The studies involving humans were approved by Ethical Committee of the Psychological Institute of the Johannes Gutenberg University Mainz. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

MR: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. EN: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Validation, Writing – original draft, Writing – review & editing. HB: Conceptualization, Data curation, Software, Supervision, Validation, Writing – review & editing, Resources.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2025.1465512/full#supplementary-material>

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8 Appendices

8.1 Appendix A – Different Approaches to Define and Measure Appreciation

Construct Name	Definition	Dimensions	Operationalization	Number of Items	Scale	Exemplary Items	Authors
Respect	"an attitude towards other people [...] that in return engenders in the target a feeling of being appreciated" (p. 345)	1	Respectful Leadership Scale	12	Five-point Likert Scale 1 (<i>not at all</i>) 5 (<i>very much</i>)	The leader (1) ... expresses criticism in an objective and constructive way. (2) ... recognizes me as a full-fledged counterpart. (3) ... provides me with any information that is relevant to me.	van Quaquebeke and Eckloff (2010), p.345
Reward	"[...] collegial or managerial recognition, material compensation and intrinsic enjoyment of the work." (p. 110)	1	Areas of Worklife Scale	4	Five-point Likert Scale 1 (<i>strongly disagree</i>) 5 (<i>strongly agree</i>)	(1) I receive recognition from others for my work.	Leiter and Masiach (1999) cited according to Bregenzer et al. (2022), pp.110, 113
Social Support	"[...] overall levels of helpful social interaction available on the job from both co-workers and supervisors" (p.69)	1	Social Support Scale	20	Four-point Rating Scale 1 (<i>not at all</i>) 4 (<i>completely</i>)	(1) How much can you rely on your colleagues/ direct supervisor when things get difficult at work? (2) How willing are your colleagues/ direct supervisor to listen to your work-related problems? (3) How much do your colleagues/ direct supervisor support you so that you have an easier time at work?	Frese (1989) Karasek & Theorell (1990), p.69
Five Languages of Appreciation	Appreciation as the combination of the five dimensions (1) words of affirmation, (2) quality time, (3) acts of support, (4) material gifts, and (5) physical touch	5	Motivating by Appreciation Inventory	60	Dyadic statement selection	(1) Go to lunch together to talk about business issues. (2) Go to lunch together and not talk about business issues. (3) Have a weekly "check in" meeting to see how things are going.	Chapman & White (2011) accessed via https://mbainventory.com/free-resources/
Appreciation	Appreciation as the combination of the four dimensions (1) respect, (2) opportunity, (3) self-efficacy, and (4) success and recognition.	4	German Appreciation Index	14	Five-point Likert Scale 1 (<i>strongly disagree</i>) 5 (<i>strongly agree</i>)	(1) my direct manager respects me as a competent discussion partner in my area of responsibility (2) I am given the freedom to implement my own ideas if these ultimately also benefit the company. (3) I can develop professionally and personally in my company.	Döring-Katerkamp & Rohrmeyer (2016)
Appreciation	Appreciation as a combination of the expressions "praise and gratitude", "trust", "responsibility", "support", and "respect" in one single-dimensional construct.	1	Appreciation at Work Scale	10	Seven-point Likert Scale 1 (<i>strongly disagree</i>) 7 (<i>strongly agree</i>)	(1) My supervisor praises me when I do my tasks well. (2) I can express my own opinion in discussions with my supervisor. (3) When my colleagues get into difficult situations and I help them with advice and support, they appreciate it.	Jacobshagen et al. (2008)
Appreciation	Appreciation as a single-dimensional construct.	1	Single Item	1	Seven-point Rating Scale 1 (<i>extremely unsatisfied</i>) 7 (<i>extremely satisfied</i>)	(1) Overall, how satisfied are you with the appreciation of your person shown by your line manager?	Stocker (2019)
Appreciation	Appreciation as a single-dimensional construct.	1	Single Item	1	Five-point Rating Scale 1 (<i>hardly ever</i>) 5 (<i>very often</i>)	(1) Do your colleagues appreciate your work?	Bakker et al. (2007)
Appreciation	The loving and benevolent attitude towards others that is transported through likewise behaviour		Theoretical Approach	/	/	/	Mettler von Meibom (2007) Schäfer (2019)

EA-SI WORK SCALE (SHORT)

8.2 Appendix B – Original EA-SI Work Scale – Colleagues

The following questions relate to the appreciation you experience from others in your day-to-day work. The important thing here is that it is about how much you personally feel valued. There are no right or wrong answers. Please answer honestly and conscientiously.

At this point, we are interested in your personal feelings and assessments. Below you will be presented with statements that relate to your colleagues.

Please indicate to what extent these statements apply to you personally. Remember specifically the last three months. Please tick the option "I cannot answer." only if it does not apply at all to your professional activity or cannot be answered.

EA-SIc_1	My colleagues take my objections seriously.
EA-SIc_2	My colleagues show me that they know and appreciate my strengths.
EA-SIc_3	My colleagues often entrust me with tasks that are important for the entire team.
EA-SIc_4	My colleagues always emphasise that they can rely on me.
EA-SIc_5	I can clearly feel that my colleagues appreciate my work.
EA-SIc_6	I feel seen by my colleagues with all my successes.
EA-SIc_7	I receive appropriate material gifts (chocolates, bouquets of flowers, food, small lucky charms, etc.) from my colleagues.
EA-SIc_8	The image my colleagues have of me matches what I do every day.
EA-SIc_9	Sometimes I feel under pressure from my colleagues.
EA-SIc_10	My colleagues make me feel that I am worth a lot.
EA-SIc_11	My colleagues show personal and professional interest in me.
EA-SIc_12	My colleagues enable me to learn new things.
EA-SIc_13	My colleagues spare no expense or effort to create a working environment in which I can work well (working environment, materials, decoration and plants, etc.).
EA-SIc_14	My colleagues also share personal and emotional topics with me.
EA-SIc_15	My colleagues give me the feeling of being part of a community.

Does not apply

Applies

I cannot answer

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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Note. Please note that the original scale was developed in German. The scale has been translated into English for better understanding. The scale's statistical validation in English is pending.

EA-SI WORK SCALE (SHORT)

8.3 Appendix C – Original EA-SI Work Scale – Supervisors

The following questions relate to the appreciation you experience from others in your day-to-day work. The important thing here is that it is about how much you personally feel valued. There are no right or wrong answers. Please answer honestly and conscientiously.

At this point, we are interested in your personal feelings and assessments. Below you will be presented with statements that relate to your direct manager. By "direct manager" we mean the manager with whom you work and have direct contact.

Please indicate to what extent these statements apply to you personally. Remember specifically the last three months. Please tick the option "I cannot answer." only if it does not apply at all to your professional activity or cannot be answered.

EA-SIs_1	My direct supervisor takes my objections seriously.
EA-SIs_2	My direct supervisor shows me that she knows and appreciates my strengths.
EA-SIs_3	My direct supervisor gives me responsibility for important company resources (financial resources, personnel, materials, etc.).
EA-SIs_4	My direct supervisor always emphasises that she can rely on me.
EA-SIs_5	I can clearly feel that my direct supervisor appreciates my work.
EA-SIs_6	I feel that all my successes are recognised by my direct supervisor.
EA-SIs_7	I receive appropriate material gifts (bonus payments, vouchers, chocolates, presents, etc.) from my direct supervisor.
EA-SIs_8	The image that my direct supervisor has of me matches what I do every day.
EA-SIs_9	Sometimes I feel under pressure from my direct supervisor.
EA-SIs_10	My direct supervisor makes me feel that I am worth a lot.
EA-SIs_11	My direct supervisor shows personal and professional interest in me.
EA-SIs_12	My direct supervisor lets me know that she sees everything I do.
EA-SIs_13	My direct supervisor spares no expense or effort to create a working environment in which I can work well (working environment, materials, technical equipment, required software, offers for joint company outings/activities, etc.).
EA-SIs_14	I can talk to my direct supervisor about personal and emotional issues.
EA-SIs_15	My direct supervisor gives me the feeling of being part of a community.

Does not apply

Applies

I cannot answer

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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Note. Please note that the original scale was developed in German. The scale has been translated into English for better understanding. The scale's statistical validation in English is pending.

8.4 Appendix D – Item Selection Prompt using ChatGPT

8.4.1 *Original Prompt*

Wähle aus den folgenden Aussagen fünf Aussagen aus:

[VERBLIEBENE NEUN AUSSAGEN NACH ERSTER ITEMSELEKTION]

Diese sollen die folgende Kriterien erfüllen:

1. Möglichst vielseitige Abbildung von erfahrener Wertschätzung
2. Anerkennen der Leistungen und Arbeit der Person
3. Vermittlung eines hohen Wertes als Person
4. Verbundenheit in der Interaktion
5. Möglichst geringe inhaltliche Redundanz
6. Möglichst geringe sprachliche Redundanz

Bitte begründe deine Auswahl.

8.4.2 *Translated Prompt*

Choose five statements from the following:

[REMAINING NINE ITEMS AFTER FIRST ITEM SELECTION]

These should fulfill the following criteria:

1. the most versatile representation of experienced appreciation possible
2. recognizing the person's achievements and work
3. conveying a high value as a person
4. connectedness in the interaction
5. as little content redundancy as possible
6. as little linguistic redundancy as possible

Please give reasons for your choice.

8.5 Appendix E – Misfit Plot for Colleagues – Original EA-SI Work Scale

8.5.1 Table E.1

Misfit Plots for Colleagues as a Source of EA-SI

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0														
2	.07	0													
3	.05	.05	0												
4	.02	.05	.02	0											
5	.01	.04	.02	.03	0										
6	0	.03	.01	.02	.01	0									
7	.02	.05	0	.02	.03	.02	0								
8	.02	.02	.04	0	.01	.01	.01	0							
9	0	.02	.07	0	.04	.01	.02	.06	0						
10	.02	0	.02	.01	.01	.02	.01	.02	.01	0					
11	.01	.02	.04	.04	.05	.01	0	.03	.03	.01	0				
12	.05	.04	.02	.02	.03	.04	.01	.04	.05	0	.09	0			
13	.02	.03	.04	.08	.02	.02	.11	.04	.01	.02	.02	.05	0		
14	.01	.01	.04	.04	.04	.02	.04	.03	.06	.03	.03	.07	.01	0	
15	0	0	.07	0	.04	.03	.14	.02	.03	.03	.06	0	0	.05	0

Note. The numbers represent the items in the order of the EA-SI Work Scale.

8.5.2 Table E.2

Misfit Plots for Direct Supervisors as a Source of EA-SI

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0														
2	0	0													
3	.02	0	0												
4	.04	.03	.05	0											
5	.03	.01	.03	.01	0										
6	.03	0	.02	0	0	0									
7	.01	.03	.04	.02	.02	.03	0								
8	.01	.01	.10	.06	.01	.01	.10	0							
9	.03	.01	.10	.01	.03	.03	.03	.06	0						
10	.02	.01	.01	.02	.02	.01	0	.03	.01	0					
11	.03	.01	.02	.03	.01	.01	.01	0	.03	.02	0				
12	.03	.01	0	.04	.01	.01	0	.01	.02	.01	.01	0			
13	.04	.04	.06	.03	.01	.03	.14	.11	.01	.01	.02	.04	0		
14	.02	0	.05	.03	.04	.04	.03	0	.06	.01	.10	0	.02	0	
15	.04	.04	.01	0	.01	.02	.04	.04	.03	.01	.02	.01	.05	.05	0

Note. The numbers represent the items in the order of the EA-SI Work Scale.

EA-SI WORK SCALE (SHORT)

8.6 Appendix F – EA-SI Work Scale (short) – Colleagues

The following questions relate to the appreciation you experience from others in your day-to-day work. The important thing here is that it is about how much you personally feel valued. There are no right or wrong answers. Please answer honestly and conscientiously.

At this point, we are interested in your personal feelings and assessments. Below you will be presented with statements that relate to your colleagues.

Please indicate to what extent these statements apply to you personally. Remember specifically the last three months. Please tick the option "I cannot answer." only if it does not apply at all to your professional activity or cannot be answered.

EA-SIc_2	My colleagues show me that they know and appreciate my strengths.
EA-SIc_5	I can clearly feel that my colleagues appreciate my work.
EA-SIc_10	My colleagues make me feel that I am worth a lot.
EA-SIc_11	My colleagues show personal and professional interest in me.

Does not apply

Applies

I cannot answer

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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Note. Please note that the original scale was developed in German. The scale has been translated into English for better understanding. The scale's statistical validation in English is pending.

EA-SI WORK SCALE (SHORT)

8.7 Appendix G – EA-SI Work Scale (short) – Supervisors

The following questions relate to the appreciation you experience from others in your day-to-day work. The important thing here is that it is about how much you personally feel valued. There are no right or wrong answers. Please answer honestly and conscientiously.

At this point, we are interested in your personal feelings and assessments. Below you will be presented with statements that relate to your direct manager. By "direct manager" we mean the manager with whom you work and have direct contact.

Please indicate to what extent these statements apply to you personally. Remember specifically the last three months. Please tick the option "I cannot answer." only if it does not apply at all to your professional activity or cannot be answered.

EA-SIs_2	My direct supervisor shows me that she knows and appreciates my strengths.
EA-SIs_5	I can clearly feel that my direct supervisor appreciates my work.
EA-SIs_10	My direct supervisor makes me feel that I am worth a lot.
EA-SIs_11	My direct supervisor shows personal and professional interest in me.

Does not apply

Applies

I cannot answer

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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Note. Please note that the original scale was developed in German. The scale has been translated into English for better understanding. The scale's statistical validation in English is pending.

EA-SI WORK SCALE (SHORT)

8.8 Appendix H – Misfit Plots – EA-SI Work Scale (short)

8.8.1 Table H.1

Misfit Plots for Colleagues as a Source of EA-SI

	Item 10	Item 5	Item 2	Item 11
Item 10	0			
Item 5	.01	0		
Item 2	.02	0	0	
Item 11	.01	.02	.03	0

Note. The numbers represent the items in the order of the EA-SI Work Scale (short).

8.8.2 Table H.2

Misfit Plots for Supervisors as a Source of EA-SI

	Item 10	Item 5	Item 2	Item 11
Item 10	0			
Item 5	0	0		
Item 2	.01	0	0	
Item 11	0	.02	.04	0

Note. The numbers represent the items in the order of the EA-SI Work Scale (short).

8.9 Appendix I – Descriptive Analyses in Study Two

	M	SD	Range	Internal Consistency	EA-SI Colleagues	EA-SI Supervisors	Self-Esteem	Perceived Stress	Appreciation Colleagues single	Appreciation Supervisors single	Environmental Politics	Work Engagement	Burnout
1	7.63	1.63	7.86	.89	—	—	—	—	—	—	—	—	—
2	6.87	2.39	9.00	.95	0.48**	—	—	—	—	—	—	—	—
3	3.81	0.87	4.00	.88	0.37**	0.25**	—	—	—	—	—	—	—
4	4.72	1.76	6.00	.86	-0.35**	-0.26**	-0.48**	—	—	—	—	—	—
5	2.53	0.86	3.75	—	0.75**	0.38**	0.22**	-0.30**	—	—	—	—	—
6	4.64	0.82	3.90	—	0.40**	0.89**	0.20**	-0.27**	0.39**	—	—	—	—
7	2.29	0.61	2.87	.90	0.08	-0.05	0.02	-0.04	0.04	-0.06	—	—	—
8	4.57	1.32	5.89	.94	0.41**	0.37**	0.26**	-0.33**	0.34**	0.34**	0.03	—	—
9	2.93	1.28	5.78	.90	-0.39**	-0.43**	-0.39**	0.55**	-0.36**	-0.46**	0.06	-0.47**	—

Note. Mean (M), Standard Deviation (SD), Range, and Cronbach's Alpha (α) have been computed. $p < .05 = *$, and $p < .01 = **$. All results refer to EA-SI measured with the newly developed short scale.

8.10 Appendix J – Data Transparency Appendix – Study One

Variables in the Complete Dataset	Poster (STATUS = presented)	MS 1 (STATUS = under review)	MS 2 (STATUS = current)	MS 3 (STATUS = planned)
Experienced Appreciation (Colleagues)		X	X	X
Experienced Appreciation (Supervisors)	X	X	X	X
Perceived Stress	X	X		X
Global Self-Esteem	X	X		X
Work Satisfaction	X	X		X
Life Satisfaction	X	X		
Work Engagement	X	X		X
Emotional Exhaustion	X	X		
Appreciation at Work Scale		X		
Appreciation single Item (Colleagues)		X		
Appreciation single Item (Supervisors)		X		
Workplace Ostracism		X		
Interpersonal Justice		X		
Political Environmental Decisions		X		
Social Support		X		
Big Five Inventory				X
Turnover Intention				X
Sleep Quality				
Effort-Reward Imbalance				

Note. The abbreviation MS stands for manuscripts planned or written using Study One's data.

8.11 Appendix K – Data Transparency Appendix – Study Two

Variables in the Complete Dataset	MS 2 (STATUS = current)	No further MS planned
Experienced Appreciation (Colleagues)	X	
Experienced Appreciation (Supervisors)	X	
Perceived Stress	X	
Global Self-Esteem	X	
Work Engagement	X	
Burnout	X	
Appreciation single Item (Colleagues)	X	
Appreciation single Item (Supervisors)	X	
Political Environmental Decisions	X	
Social Support	X	
Turnover Intention		

Note. The abbreviation MS stands for manuscripts planned or written using Study Two's data.

4.5 Research Objective – Original Empirical Study Three

As described before, putting the individual's self-esteem in the center of attention has substantially driven the decision to anchor EA-SI in the SOS theory as an adequate theoretical framework. Although the SOS theory originates from the occupational context, EA-SI was developed with the intention of creating an integrative psychological construct that is applicable across various areas of humans' lives while countering the aforementioned research gap. To further understand the idea of transferring EA-SI and its theoretical framework to another area of human life, the idea of the theory crisis in psychology will briefly be outlined. Referring to Eronen and Bringman (2021), the psychological science is not only confronted with a replication crisis but also with a theory crisis. This assumption is based on the fundamental consideration by Meehl (1967) that elaborating theories in the field of psychology represents somewhat of a paradox resulting from the discrepancy between the need to define strong theoretical frameworks on the one hand and the reluctance to critically test them based on empirical research (and across different areas) on the other hand. Following Meehl (1967), psychological research should invest more time and resources in solid, but also well-investigated and falsifiable theory-building when testing scientific constructs. More than fifty years later, Eronen and Bringmann (2021) point out that numerous psychological theories are not elaborated in-depth, characterized by a short life span, and add little cumulative value to the field. This is what they refer to as the *theory crisis* in psychology.

As theories rise and fall, the question arises of what characterizes a theory that significantly contributes to psychological research over time. To answer this question, Eronen and Bringmann (2021) identified three criteria. First, the phenomenon explained by the theory must be robust enough to be empirically investigated. Second, the psychological constructs used within the theory must be adequately validated. Third, when testing the theory, researchers should strive to identify directional effects whenever possible within a probabilistic science such as psychology (Eronen & Bringmann, 2021).

Therefore, the third original empirical study strives to (1) extend the knowledge on EA-SI and (2) strengthen the nomological network of the SOS theory by testing them both in another highly important area of human life not only preparing for future occupational goals (Johnson, 2000) but also shaping humans' interests (Todt, 1985) and perspectives in young adulthood (Heerde et al., 2025): the school context. To further counter the theory crisis (Eronen & Bringman, 2021), (3) the relations between experienced appreciation and relevant outcomes will not only be tested cross-sectionally but also on a daily basis over the period of four (school) weeks. The following research questions will guide the third original study:

- Q1:** Can EA-SI be reliably measured over time and can the assumed single-dimensional structure be replicated using the EA-SI School Scale?
- Q2:** Are the assumptions of the SOS theory replicable in the school context?
- Q3:** Does experienced teacher appreciation on the present day predict high school students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day?

High school students will be investigated as appreciation receivers and their teachers as appreciators. A diary study based on self-reports will be applied over four consecutive school weeks. An adapted full-length and short version of the EA-SI Work Scale will be deduced. The factorial validity of EA-SI will be tested with exploratory (e.g. O'Connor, 2000) and confirmatory (e.g., Hu & Bentler, 1999) factor analyses. To test the assumptions of the SOS theory, Pearson product-moment correlations (e.g., Kurtz & Mayo, 1978) combining cross-sectional and longitudinal measures will be applied. The relation between experienced appreciation from teachers on the present day and students' motivation, well-being, satisfaction, and self-efficacy the next day will be investigated using multilevel analyses. Daily surveys (level one) will be nested in students (level two) to investigate fixed and random effects (e.g., Nezlek, 2020).

4.6 Original Empirical Study Three

Resch, M. S., Zmatlik, F., Weinstein, E. R., Bellhäuser, H. (submitted). Student-teacher interactions can be EA-SI – A diary study to investigate the facilitating role of daily appreciation from teachers for high school students' well-being, motivation, satisfaction, and self-efficacy. *Teaching and Teacher Education*.

Student-Teacher Interactions can be EA-SI

—

**A Diary Study to Investigate the Facilitating Role of Daily Appreciation from Teachers
for High School Students' Well-Being, Motivation, Satisfaction, and
Self-Efficacy**

Maximilian Stefan Resch, Franziska Zmatlik, Elsa Rose Weinstein, Henrik Bellhäuser

Abstract

This study investigates the role of daily experienced appreciation from teachers for high school students' everyday school lives. Hence, (1) the reliability and validity of the construct experienced appreciation in social interactions (EA-SI) were tested at school using the EA-SI School Scale. Moreover, (2) the role of experienced appreciation from teachers for high school students' next-day motivation, well-being, school satisfaction, and self-efficacy was tested. A longitudinal diary design, enclosing four consecutive school weeks, was applied. $N = 417$ participants, attending grades five to nine, participated in the first survey, $N = 336$ participated in the second survey, and $N = 119$ regularly filled in the diary. Factor analyses, internal consistency, test-retest reliability, and Pearson product-moment correlations strengthened the constructs' reliability and validity. Multilevel analyses identified experienced teacher appreciation on the present day to significantly predict all dependent variables the next day. Conclusively, strengths, limitations, and implications are discussed.

Keywords: student-teacher interactions, appreciation, EA-SI, stress, well-being

Introduction

In a nutshell, the quality of student-teacher relationships influences students' social, behavioral, and academic outcomes (McGrath & Van Bergen, 2015). For example, student-teacher interactions facilitate students' well-being and positive learning experiences (Cornelius-White, 2007), self-concept (McFarland et al., 2016), and academical performance (Göktaş & Kaya, 2023). More positive student-teacher interaction and more teacher engagement lead to higher student engagement in their lessons at school (Li et al., 2024). The quality of the relationship between teachers and students predicts students' emotional well-being and their individual experiences (Mainhard et al., 2018) beyond the influence of individual traits (Kenny et al., 2013). Student-teacher relationships promote students' cognitive development in terms of executive functions and working memory (Vandenbroucke et al., 2018), while teacher enthusiasm facilitates students' enthusiasm and the feeling of being emotionally supported at school (Lazarides & Schiefele, 2024).

The significance of the student-teacher relationship for student-related outcomes raises the question of which variables it is influenced and characterized by. Following Howells (2014), expressed gratitude from teachers can influence the quality of student-teacher interactions. Jasrial et al. (2021) highlight the facilitating role of verbal and non-verbal compliments from teachers while Krane et al. (2017) point towards teacher kindness as a central influence on student-teacher interactions. Cornelius-White (2007) indicate in his meta-analysis that the quality of student-teacher interactions is significantly facilitated by applying a learner-centered approach. Accordingly, the findings by Cui (2022) and Aldrup et al. (2018) imply teacher appreciation to be one of the main influences characterizing the quality of the interaction between students and teachers.

When investigating appreciation in the educational context, the construct is (regardless of its relevance) oftentimes incoherently defined and embedded in theories limited in explaining the underlying mechanism of action. The definition and measurement of the construct

appreciation appear to be incongruent across studies, making it difficult to coherently investigate appreciation at school since the comparability across various studies is questionable. To exemplify name three different understandings of appreciation at school, Zimmerman and Schunk (2011) propose a four-faceted structure, while the original five languages of appreciation by White and Chapman (2013) have been applied to the educational context, and Carstensen et al. (2021) expects appreciation to be one-faceted.

To counter the research gap of incongruently defining and investigating appreciation, Resch and Bellhäuser (2025) developed a new construct named *Experienced Appreciation in Social Interactions* (EA-SI), combining different understandings of appreciation in one integrative construct. To theoretically derive the expected relations between EA-SI and various outcomes (e.g., self-esteem, perceived stress, well-being, motivation and satisfaction), the well-established *Stress-as-Offense-to-Self theory* (SOS; Semmer et al., 2007) builds the construct's theoretical framework. This new construct and its theoretical framework have been validated and replicated in several studies in the occupational context (Resch & Bellhäuser, 2025; Resch et al., 2025).

Based on the aforementioned findings and research gap, this study aims to (1) test the reliability and validity of the construct EA-SI and to (2) replicate the theoretical assumptions of the SOS theory in the context of high school. After testing these prerequisites, ensuring the reliability and validity of the construct and the replicability of its theoretical foundation at school, we will (3) investigate the role of experienced teacher appreciation for students' daily intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy, applying a longitudinal diary study over a period of four consecutive school weeks. This study is guided by the following research questions:

Q1: Can EA-SI be reliably measured over time and can the assumed single-dimensional structure be replicated using the EA-SI School Scale?

Q2: Are the assumptions of the SOS theory replicable in the school context?

Q3: Does experienced teacher appreciation on the present day predict high school students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day?

Theoretical Integration of EASI in the Educational Context

Since it is the aim of this study to facilitate a more congruent and comparable understanding of experienced appreciation in the educational context, it is crucial to include a well-established theory, explaining the assumed mechanisms of action. Hence, in the following section the SOS theory will be introduced as EA-SI's theoretical framework. Subsequently, we will outline the definition of the construct EA-SI, deriving its influential role for students' self-esteem and stress but also their intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy. The term “EA-SI” will be used to address the theoretical construct, while “EA-SI School Scale” and “EA-SI School Scale (short)” will be used to address its operationalization.

The Stress-as-Offense-to-Self Theory

At the core of the SOS theory is the assumption that developing and maintaining a positive self-esteem represents a basic human need (Semmer et al., 2007). Self-esteem is oftentimes theoretically segmented into a social (based on the evaluation through others) and a personal (based on the self-evaluation of the own worth) component (Lazarus, 1999). However, previous studies pointed towards high interrelatedness of both aspects, converging on the construct of global self-esteem (von Collani & Herzberg, 2006). The *global self-esteem* describes the evaluation of one's own worth (Schütz & Röhner, 2023), based on subjective parameters (Brown, 2010) but also influenced by signals sent by the individual's social environment (Leary & Baumeister, 2000). This definition of global self-esteem is widely applied in the professional and educational context (e.g., Ibrahim et al., 2022; Pullmann & Allik, 2008; Rosenberg et al., 1995).

Assuming that maintaining a positive self-esteem is a basic human need, the question arises of how students' self-esteem can be strengthened and what consequences should be expected in case of an attack on the self. The SOS theory postulates that there should be specific boosts and threats to an individual's self-esteem (Semmer et al., 2019). A *boost* strengthens the individual's self-esteem, satisfying the underlying need. A *threat* is perceived as an attack on the self, violating the need for a positive self-esteem. Both boosts and threats can be perceived directly or indirectly from one's social environment (Semmer et al., 2019). An example of a boost is appreciation from others. In contrast, the demand to execute a specific task that is perceived as illegitimate and not part of one's own role or responsibilities can be understood as a threat (Semmer et al., 2019).

Experiencing an attack to one's self – due to a threat or the insufficient expression of a boost – violates the underlying human need. The resulting necessity to defend one's self-esteem against the experienced offense should then be accompanied by the sensation of stress (Semmer et al., 2019). While the original theory distinguished between stress through insufficiency (SIN) and stress as disrespect (SAD), recent studies showed that an attack on the self was also related to individuals' general stress perception (Resch & Bellhäuser, 2025; Resch et al., 2025). *General stress perception* combines the four dimensions of *worries*, *tension*, *demands*, and *joy* (Fliege et al., 2001).

The perceived stress is then ultimately related to various outcomes (Semmer et al., 2019). In line with Liu et al. (2020) these effects are not expected to be limited to a single aspect of human life but to spill over from one area (e.g., work or school) to others (e.g., familial).

Experienced Appreciation in Social Interactions – Defining an Integrative Construct

EA-SI is built on a combination of various conditional and unconditional expressions of appreciation combining them in one integrative construct definition. EA-SI distinguishes between two interaction partners: the person who sends appreciative signals (the appreciator) and the one who feels appreciated (the appreciation receiver). In this study the term *appreciator*

refers to teachers and the term *appreciation receiver* refers to students. EA-SI puts the feeling of being appreciated in the center of attention, regardless of the appreciator's intentions.

Conditional appreciation is linked to the feeling of being appreciated by one's teacher for a specific behavior, achievement, or individual quality. Referring to the understanding of EA-SI, the appreciation receiver experiences conditional appreciation when feeling trusted (e.g., Semmer et al., 2007) and taken seriously in their opinions (e.g., Yukl et al., 2002), being acknowledged for their competencies, strengths, and achievements (e.g., Stocker et al., 2014), and having the feeling that the appreciator is willing to invest time and resources to benefit their individual and academic development (e.g., Siegrist, 2016).

Being unconditionally appreciated means to feel recognized, heard, and valued as a human being regardless of any prerequisite. The appreciation receiver feels appreciated when treated without violence (Rosenberg, 2015) and in a respectful way (e.g., Apostel et al., 2018). In accordance with the client-centered approach proposed by Rogers (1991), unconditional appreciation is perceptible when feeling authentically listened to and being allowed to socially and emotionally bond with the appreciator. Additionally, EA-SI includes the feeling of belonging and being included as a valued part of a (class) community.

Although appreciation is oftentimes intermingled with other constructs, previous studies strengthen its incremental value as an autonomous construct when compared to social support (e.g., Resch & Bellhäuser, 2025; Semmer et al., 2019) or interactional justice (Stocker et al., 2010).

Integrating previous insights, EA-SI can be experienced in public and more personal dyadic settings, verbally or non-verbally, and directly or indirectly (e.g., Adair, 2009; Stocker et al., 2014). Therefore, a short comment in the right corner of a test that reads “Well done! 😊” (indirect, verbally, personal) can be a manifestation of EA-SI, just as acknowledging a student’s efforts in front of their classmates (direct, verbally, public) would be. Despite the multitude of manifestations and channels to transport EA-SI, the construct is unidimensional in structure

(Resch & Bellhäuser, 2025). To test the assumptions of the SOS theory in the school context, the following hypotheses are derived.

H1: The more students feel appreciated by their teachers on a daily basis, the higher their global self-esteem.

H2: The more students feel appreciated by their teachers on a daily basis, the lower their daily stress perception.

H3: The higher students' global self-esteem, the lower their daily stress perception.

EA-SI and Intrinsic Motivation

Following the SOS theory, an attack on the self (in terms of lacking teacher appreciation) results in the need to defend one's self-esteem and, ultimately, the sensation of stress. The experience of stress is related to numerous outcomes such as students' motivation, well-being, performance, and physical health (Pascoe et al., 2019).

Intrinsic motivation is defined as students' ambition to fulfill specific tasks or engage in specific activities originating from a self-driven sensation of joy or interest. This drive results from within the individual instead of being primarily based on external incentives (Kröner et al., 2017). Students report higher motivation, the more positive their student-teacher interaction (Lazarides & Schiefele, 2024), the stronger their feeling of belonging to their own school (Gillen-O'Neel & Fuligni, 2013), and the lower their self-reported stress level (Liu, 2015) is.

Higher intrinsic motivation is related to better school performance (Ahmetovic et al., 2020) and academical achievements over time (Taylor et al., 2014). The more students are intrinsically motivated, the higher their engagement at school and the more likely it is that they define goals focused on learning instead of avoiding failure (Froiland & Worrell, 2016). Intrinsic motivation is associated with increased depth when processing information, using meta-cognitive strategies, and therefore by proxy relates to higher effectiveness in learning (Larson & Rusk, 2011).

In line with the SOS theory, we assume that students who feel more appreciated when interacting with their teachers – influencing their stress sensation by boosting their self-esteem – should report higher intrinsic motivation at school.

H4: The more students feel appreciated by their teachers on the present day (t), the higher their intrinsic motivation the next day (t+1).

EA-SI and Subjective Well-being

Subjective well-being is based on hedonic considerations (Deci & Ryan, 2008). The more an individual experiences happiness and positive affect, the higher their subjective well-being (Hobbs et al., 2022).

Previous research pointed out that students' subjective well-being is influenced by their student-teacher relationship (Murray-Harvey, 2010), the feeling of being accepted by their teachers (Eckert et al., 2025), and the experienced teacher support (Vedder et al., 2005). The more students evaluate their teachers as friendly and helpful, the higher their well-being (van Petegem et al., 2007). Students who feel appreciated by their teachers show increased health literacy and well-being (Kostenius & Bergmark, 2016). A higher level of stress, in terms of feeling treated inappropriately by their teachers, is positively associated with school burnout (Walburg, 2014).

Students' subjective well-being plays a relevant role in students' everyday (school) lives. For example, students' well-being is associated with their mental health (Shoshani & Steinmetz, 2014), the early onset of mental disorders (Robert Bosch Stiftung, 2024), and their performance at school (Murray-Harvey, 2010). In contrast, feeling stressed at school is associated with worse school achievements, higher school dropout (Bask & Salmela-Aro, 2013), and an increased risk of developing mental health issues (Walburg, 2014). Referring to the SOS theory and the aforementioned studies, we propose the following hypothesis.

H5: The more students feel appreciated by their teachers on the present day (t), the higher their subjective well-being the next day (t+1).

EA-SI and School Satisfaction

School satisfaction describes the evaluation of whether one's school-related surroundings meet the own expectations and needs (Baker & Maupin, 2009). Variations in school satisfaction are influenced by numerous factors (Suldo et al., 2014). In line with the SOS theory, higher school-related self-esteem relates to higher school satisfaction (Karatzias et al., 2002) while higher stress relates to decreased school satisfaction (Lardier et al., 2020). The more positive students rate their classroom climate (on an individual and on a shared classroom-level) the more satisfied they are with their learning (Nolen, 2003).

The better the school climate and relationship between students and their teachers (Zullig et al., 2011), and the more students feel academically supported (Jiang et al., 2013), the higher their school satisfaction. As Casas et al. (2013) pointed out, students' school satisfaction is mainly built on the evaluation of teachers' behavior while students' satisfaction with their school friends and classmates is an influence of limited relevance.

Students who are more satisfied with school show better academic performance (Crisp et al., 2015), better grades and a reduced tendency for absenteeism (Daily et al., 2020), increased self-efficacy and reduced risk for dropout (Peditzi, 2024). Tian et al. (2015) showed that higher school satisfaction is related to an increased feeling of belonging to one's own school benefitting students' motivation (Gillen-O'Neel & Fuligni, 2013). Moreover, students' satisfaction with school represents one of the most relevant influential factors on their overall satisfaction with life (Suldo et al., 2014). Hence, we assume: Following the SOS theory and the aforementioned empirical findings, we expect students who feel appreciated by their teachers to be more satisfied with school.

H6: The more students feel appreciated by their teachers on the present day (t), the higher their school satisfaction the next day (t+1).

EA-SI and Student Self-Efficacy

In line with Bandura (1978), *self-efficacy* describes a person's expectation to be able to perform specific person-centered actions to sufficiently obtain a desired outcome. An individual's *efficacy expectation* should be theoretically distinguished from their *outcome expectation*. Accordingly, an individual could evaluate a specific outcome to be highly probable but not take appropriate actions if they were not expecting to be able to perform the behavior needed to achieve the outcome. Therefore, an individual's self-efficacy should significantly influence their choice of actions and coping strategies based on their efficacy expectation (Bandura, 1978). As sources of self-efficacy, Bandura (1978) postulated (1) the experience of mastery when performing a given task, (2) observing others and learning from them as models, (3) experiencing verbal reassurance and empowerment to master specific challenges, and (4) emotional and physiological arousal.

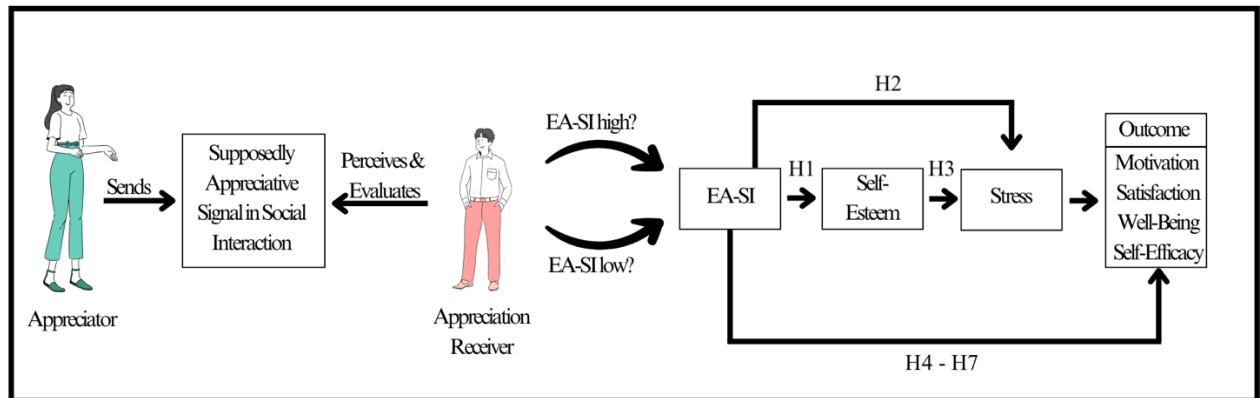
The more students expect to be self-efficient, the better their grades (Lent et al., 1984) and academic achievements (Olivier et al., 2019), the higher their school-relatedness and intrinsic motivation (Wang et al., 2024), the higher their resilience (Karaman et al., 2020), and the lower their school-related anxiety (Măirean et al., 2022). In addition, perceived stress and reduced self-efficacy are negatively related to college students' academic performance (Zajacova et al., 2005).

Referring to the sources of self-efficacy (Bandura, 1978), we assume that experienced appreciation from teachers facilitates the feeling of mastery while also representing verbal reassurance and empowerment. Hence, extending the SOS theory by students' self-efficacy as a potential outcome, we expect students who feel more appreciated by their teachers to feel more self-efficient. Figure 1 summarizes the theoretical model and all research hypotheses.

H7: The more students feel appreciated by their teachers on the present day (t), the higher their self-efficacy the next day ($t+1$).

Figure 1

Expected Relations Between EA-SI, Self-Esteem, Stress and Outcome Variables at School



Note. The graphic summarizes all seven scientific hypotheses (H) in one schematic depiction.

Method

Sample

The sample consists of high school students attending grade five to nine in one of five surveyed German high schools. Participants were informed that taking part in the survey was voluntary and anonymous and that they could end their participation at any time without experiencing negative consequences. To ensure procedural objectivity, T1 and T2 were supervised on side by researchers, auxiliary researchers, and students in their bachelor's and master's program specifically trained prior to data collection. During the diary phase, teachers were instructed to allow for time to complete the five-minute questionnaire at the beginning of the day. The participating schools provided adequate hardware, so all students had equal chances to access the diary.

To participate in the study, students had to fulfill several inclusion criteria beyond parental consent. All participants had to (1) attend fifth to tenth grade, (2) answer the survey honestly and concentrated, and (3) have complete entries with non-duplicate, matchable identification codes. To be included in the diary analyses, participants (4) had to answer at least 80% of all diary entries.

Table 1 shows all relevant demographic data for T1, the diary, and T2. Applying the aforementioned inclusion criteria, the final sample of T1 enclosed N = 417 participants. In the diary, a total of N = 119 participants with a minimum of 13 diary entries were included in the analysis. N = 336 participants were analyzed in T2.

Table 1

Demographic Characteristics of the Study Sample

	T1	Diary	T2
<i>N</i>	417	119	336
Age			
<i>MEAN</i>	11.98	12.16	11.89
<i>SD</i>	(1.45)	(1.17)	(1.40)
<i>MIN</i>	9	10	9
<i>MAX</i>	17	14	15
Gender			
<i>Female</i>	167	52	144
<i>Male</i>	231	64	184
<i>Non-binary</i>	3	–	1
<i>Not specified</i>	9	1	3
<i>Not answered</i>	7	2	4
Grade			
<i>5th</i>	88	10	74
<i>6th</i>	102	39	86
<i>7th</i>	22	–	16
<i>8th</i>	174	69	136
<i>9th</i>	24	–	19
<i>Not answered</i>	7	1	5

Note. The mean (MEAN), standard deviation (SD), minimum (MIN) and maximum (MAX) of continuous variables are shown. Categorical variables are displayed in absolute numbers.

Design and Sampling Procedures

An observational field study was applied. To test the reliability and validity of EA-SI and to investigate the role of experienced appreciation for students' intrinsic motivation, subjective well-being, school satisfaction and self-efficacy on an everyday basis, we applied a longitudinal diary over four consecutive school weeks. The diary was flanked by one cross-sectional questionnaire prior to and after the diary period. Data collection took place at the

beginning of the school year in the fall of 2023. We used online-based self-reports hosted via SoSci Survey (Leiner, 2024).

Schools were recruited via E-mail, personal contact, and flyers. Prior to data collection, three classes – including one fifth, sixth and eighth grade each – were tested in a pilot study to confirm the questionnaire’s comprehensibility. The study was approved by the “Aufsichts- und Dienstleistungsdirektion” (ADD) of Rhineland-Palatinate. The ADD is the supervisory authority, overseeing educational matters and ensuring compliance with ethical standards regarding research involving (high school) students in the federal state.

A total of five German high schools in Rhineland-Palatinate agreed to cooperate. Two other secondary schools had to be excluded, not fulfilling the inclusion criteria. Data were collected on school days Monday through Friday.

Instruments

All instruments were aligned by using a 6-point Likert scale from 1 (*Does not apply*) to 6 (*Does apply*) to improve comprehensibility and comparability. The instructions were focused on yesterday or the present day depending on the construct's focal point. The first person singular was used consistently for all items in the diary.

Experienced Appreciation in Social Interactions

To measure the appreciation students received when interacting with their teachers the EA-SI Work Scale (Resch & Bellhäuser, 2025) was adapted to fit the school context. We removed one item from the original number of 15 items, which read “I receive appropriate gifts (e.g., bonus payments, gift certificates, chocolates)”, and did not fit within the context of student-teacher interactions. The adapted scale, named "EA-SI School Scale", was used for both cross-sectional questionnaires (T1, T2). One exemplary item reads, “My teachers take my concerns seriously.”

Referring to the EA-SI Work Scale (short; Resch et al., 2025) we applied four items of the EA-SI School Scale within the diary. We will refer to this instrument as "EA-SI School

Scale (short)". One of the items is, "My teachers showed me that I am worth a lot". For a detailed depiction of all items of the EA-SI School Scale see Appendix A.

Global Self-Esteem

Students' self-esteem was measured at T1 and T2 using the Kid-KINDL by Ravens-Sieberer et al. (2000). The four items ensured easy comprehensibility since the instrument is applicable for children from the age of seven. An example item is "I was proud of myself".

Perceived Stress

Students' stress perception was measured with the short version of the Perceived Stress Questionnaire (PSQ-8; Umucu et al., 2018) originally developed by Fliege et al. (2009). The instrument comprises eight items. A sample item is, "Overall, you feel tense".

To measure perceived stress within the diary, we applied two items from the PSQ-8 (Umucu et al., 2018). One of these items reads, "I felt tense."

Intrinsic Motivation

To measure intrinsic motivation we applied six items of the German Academic Self-Regulation Questionnaire (SRQ-A) by Kröner et al. (2017). An example is "In general I work and learn in school ... because I enjoy doing my classwork".

In the diary intrinsic motivation was measured with one adapted item, referring to the SRQ-A (Kröner et al., 2017). The item reads, "I am motivated at school because I enjoy working and learning."

Subjective Well-being

Subjective well-being was measured – both cross-sectionally and in the diary – with the same two items of the KIDSCREEN questionnaire, developed by Ravens-Sieberer et al. (2014). An exemplary item is, "I feel fit and well".

School Satisfaction

School Satisfaction was measured in both the cross-sectional and in the diary data collection, using one item by Baillod and Semmer (1994). We adapted the item – originally

developed to measure work satisfaction – to fit the school context. The applied item reads, “I enjoyed school a lot.”

Self-Efficacy

Self-efficacy was measured using the General Self-Efficacy Short Scale (ASKU; Beierlein et al., 2014). One of the three applied items reads, "I can rely on my own abilities in difficult situations".

In the diary, we measured students' self-efficacy with one item developed by Bellhäuser et al. (2019). The item reads, "I am convinced that I can achieve my goals".

Additional Measures

The data collection was part of a broader research initiative called SMASH study (Self-Regulated Learning, Musicality & Creativity, Appreciation, Sports, and High Giftedness), conducted by a team of researchers at the Johannes Gutenberg university. Therefore, students' grades, extrinsic motivation, personality traits, self-regulated learning, satisfaction with learning, and motivation to do sports, music, and art were also surveyed. Since these constructs are of no relevance to the present study, they will not be further considered.

Transparency and Openness

All relevant constructs, instruments, and inclusion criteria are reported transparently. Data was collected via university-internal servers at the Johannes Gutenberg university. The study was preregistered (https://osf.io/ey6wd/overview?view_only=a654ab84_a6fd47df9313ff_f9c968db63) and the processed data, including all relevant constructs, has been made public via the data repository of the Open Science Framework (https://osf.io/t7dek/overview?view_only=0dcca4c35_9648ad836aa001cbc2a637). The data analyses were conducted using open source software, and the developed instruments to measure EA-SI are publicly depicted in full-length in the appendix. No code was uploaded.

The wording of the preregistered hypotheses was adapted to fit the manuscript while the expected relations do not deviate from the preregistration. Due to special vacation days outside

of our knowledge at the time of preregistration, students could only fill in a maximum of 17 – instead of 20 – diary entries. Applying the preregistered cut off, we included all participants with at least 13 entries.

Statistical Analysis

Data analysis was conducted using the software R (version 4.5.1; R Core Team, 2025) and the integrated development environment RStudio (version 2025.09.2; Posit team, 2025). The analyses in R were performed using the following packages: tidyverse (v1.3.1; Wickham et al., 2019), psych (v.4.6.26; Revelle, 2025), nlme (v3.1-168; Pinheiro et al., 2025), lme4 (v1.1-37; Bates et al., 2015) and Rmisc (v1.5.1; Hope, 2022).

After removing data sets not meeting the inclusion criteria and inverting reverse-coded items, we investigated internal consistency, test-retest reliability and factorial validity of the EA-SI School Scale. Cronbach's α was assessed as a measure of internal consistency. Applying the cut offs suggested by Blanz (2021), we interpreted $\alpha < .5$ as unacceptable, $\alpha \leq .6$ as low, $\alpha \leq .7$ as questionable, $\alpha \leq .8$ as acceptable, $\alpha \leq .9$ as high, and $\alpha > .9$ as excellent. The test-retest reliability was measured with Pearson product-moment correlations between the cross-sectional time points T1, T2 and the aggregated diary entries. A correlation coefficient of $r \geq .70$ indicates acceptable, $r \geq .80$ good, and $r \geq .90$ high test-retest reliability (Moosbrugger & Kelava, 2020). As level of significance, we chose $p < .01$.

Additionally, we tested for EA-SI's factorial validity, conducting a confirmatory factor analysis based on T1. Pre-requirements were tested with the Kaiser-Meyer-Olkin criterion (Kaiser, 1974; KMO) and Bartlett's test for sphericity. The number of factors was limited to one. The sample was qualified for factor analyses, referring to Harlow (2014) and MacCallum et al. (1999) who suggest a sample size between 200 to 400 participants to be appropriate. The model fit was tested, using maximum likelihood estimation based on 5,000 bootstraps. In addition to the χ^2 -Test of model fit, which is sensitive to sample size (Kline, 2023), we interpreted the Standardized Root Mean Square Residual (SRMR), Comparative Fit

Index (CFI), and Root Mean Square Error of Approximation (RMSEA) to determine the fit of the expected one-factor solution. Values of SRMR < 0.08 (Byrne, 2013), CFI > 0.95 (Hu & Bentler, 1999), and RMSEA < 0.08 (Awang, 2012) were interpreted as indicators of good model fit. Additionally, we conducted exploratory factor analysis determining the number of factors based on scree plot and parallel analysis (O'Connor, 2000). Since the explorative analysis served as an additional insight consolidating the expected one-factor model, it is reported only in appendix C.

To test the assumptions of the SOS theory regarding students' self-esteem, stress, and experienced appreciation (H1 to H3), we conducted Pearson product-moment correlations between T1, T2, and the aggregated diary entries. Applying cut-off values by Cohen (1988), $r > 0.1$ was interpreted as small, $r > 0.3$ as moderate, and $r > 0.5$ as strong correlation.

The diary study design resulted in a hierarchical data structure, with daily observations (level 1) nested within individuals (level 2). To investigate the influence of experienced appreciation on students' daily intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy (H4 to H7), we applied multilevel modeling (MLM). Each outcome on day $t+1$ was modelled as a function of the predictor on day t . Due to the diary procedure, participants reported their well-being, intrinsic motivation and self-efficacy for the current day, while they had to refer to the previous day to evaluate their experienced appreciation and school satisfaction. This resulted in a natural lag between EA-SI and well-being, intrinsic motivation and self-efficacy, whilst school satisfaction was artificially lagged. Only observations with consecutive measurement occasions were included. The multilevel modeling approach allowed us to examine both within-person and between-person effects (Nezlek, 2020) testing whether fluctuations regarding previous days were associated with next-day outcomes.

We first fit an unconditional model with random intercepts to calculate the intraclass correlations (ICC), describing the proportion of between-person variance. For any given model, this was defined as

$$Y_{ti} = \beta_{0i} + r_{ti}$$

with Y_{ti} as the outcome of individual i on any given day t , predicted by the person-specific intercept β_{0i} and the residual error term r_{ti} . The residual error term is characterized as the deviation at measurement occasion t from an individual i 's baseline. The intercept is defined as a function of the sample grand mean γ_{00} and the random residual error term u_{0i} at the individual level.

$$\beta_{0i} = \gamma_{00} + u_{0i}$$

The random coefficients describe how far any individual i deviates from the grand mean. The u -terms are assumed to follow a normal distribution with a mean of 0 and a variance of τ_{00}^2 (Wickham & Knee, 2013).

The final model included two explanatory variables at the lowest level. Both the measurement occasion (e.g., day of the diary entry) and the independent (predictor) variable of interest were included as fixed coefficients, with random slopes to allow the coefficients to vary between individuals. This model is described by the following equation

$$Y_{t+1i} = \beta_{0i} + \beta_{1i}T_{ti} + \beta_{2i}X_{ti} + r_{ti}$$

with the outcome on day $t+1$ of individual i described as a function of the random intercept and error, the explanatory variable measurement occasion T_{ti} and the predictor of interest X_{ti} as well as their slope coefficients β_{1i} and β_{2i} . The subscript i indicates that these slope coefficients are random, meaning they can vary freely between individuals. Next to these time-varying covariates, we implemented gender and age as time-invariant control variables on the second level to control for their impact on the equation (Hox et al., 2010). Gender was zero-centered, while age was grand-mean centered. This resulted in

$$\beta_{0i} = \gamma_{00} + \gamma_{01}A_i + \gamma_{02}G_i + u_{0i}$$

with the random intercept modelled as a function of the grand mean, residual error term as well as age and gender and their respective slope coefficients. In this case the missing subscript i indicates the coefficients were not free to vary between participants, instead, a fixed

effect was assumed for both covariates. After substituting with $\beta_{1i} = \gamma_{10} + u_{1i}$ and $\beta_{2i} = \gamma_{20} + u_{2i}$ this resulted in the following final equation of

$$Y_{t+1i} = \gamma_{00} + \gamma_{01}A_i + \gamma_{02}G_i + \gamma_{10}T_{ti} + \gamma_{20}X_{ti} + u_{1i}T_{ti} + u_{2i}X_{ti} + u_{0i} + r_{ti}.$$

Since data based on consecutive days are often not independent from each other – violating the assumption of independent within-group errors (Crawley, 2007) – we included an autoregressive residual structure in the final model to account for within-person autocorrelation (Hox et al., 2010). All models were estimated using restricted maximum likelihood (REML), which has been shown to produce less biased results compared to other methods of estimation (Hox et al., 2010). Model fits were additionally assessed on basis of the fit indices Akaike information criterion (AIC; Hemmerich, 2021a) and Bayesian information criterion (BIC; Hemmerich, 2021b), with lower values indicating a better fit when comparing different models.

The point estimates β were conducted to investigate the relative influence of the predictor on the dependent variable. For example, a point estimate of $\beta = 0.14$ would indicate that the increase of the predictor by one scale unit on the present day would be accompanied by the increase of the outcome by 0.14 units the next day.

Furthermore, we calculated the marginal R_m^2 and conditional R_c^2 as indicators of effect size. R_m^2 describes the variance explained only by the fixed intercept and slope, based on only the predictors and limited to the within-person level. R_c^2 describes the variance explained by both fixed and random effects, allowing for between-person variation. Since there are no fixed cut offs, R_m^2 must be interpreted in relation to R_c^2 (Nakagawa & Schielzeth, 2012).

Results

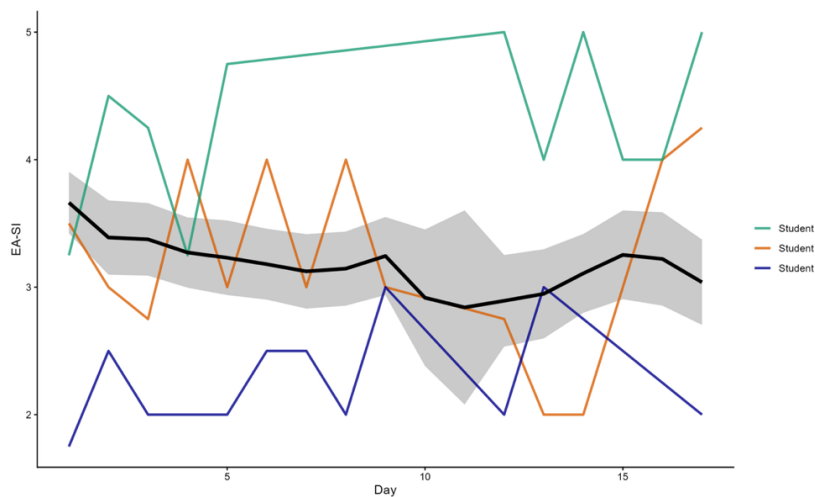
Preliminary Analyses

The EA-SI School Scale showed internal consistencies of $\alpha = .94$ (T1) and $\alpha = .95$ (T2). Appendix B depicts mean, standard deviation, internal consistencies, minimum, and maximum of all constructs.

Figure 2 shows the average trend of experienced appreciation over the period of four weeks as well as three exemplary individual patterns of change for students' with descriptively low, medium, and high experienced appreciation. The test-retest reliability of the EA-SI School Scale was $r = .73, p < .001$ between T1 and T2. When correlating the cross-sectional time points with the aggregated diary entries, the test-retest reliability was $r = .70, p < .001$ (T1 – diary) and $r = .81, p < .001$ (T2 – diary).

Figure 2

Aggregated and Individual Trend of EA-SI over Four Consecutive School Weeks



Note. The black slope shows the average trend across all students, while three exemplary individual patterns of change are depicted as colored slopes. The grey area represents the 95% confidence interval.

Additionally, we tested for the assumed single-dimensional structure of EA-SI prior to hypotheses testing. The data was marvelously suited for factor analysis $KMO = .96$ (Watkins, 2018), while no random data structure was implied by Bartlett's test for sphericity $\chi^2(91) = 3863.35, p < .001$ (Bartlett, 1954). The χ^2 -Test of the confirmatory factor analysis based on 5,000 bootstraps and maximum likelihood rotation with a single fixed factor was significant $\chi^2(77) = 217.70, p < .001$. The additional fit indices indicated good model fit with $CFI = 0.963$, $RMSEA = 0.068$, 90% $CI [0.057; 0.078]$, and $SRMR = 0.036$.

Subsequent to the preliminary analyses, hypotheses testing will be presented. Figure 3 sums up all research questions and hypotheses in one comprehensive graphic.

Figure 3

Summary of all Research Questions and Scientific Hypotheses

Q1: Can EA-SI be reliably measured over time and can the assumed single-dimensional structure be replicated using the EA-SI School Scale?	
Q2: Are the assumptions of the SOS theory replicable in the school context?	H1: The more students feel appreciated by their teachers on a daily basis, the higher their global self-esteem. H2: The more students feel appreciated by their teachers on a daily basis, the lower their daily stress perception. H3: The higher students' global self-esteem, the lower their daily stress perception.
Q3: Does experienced teacher appreciation on the present day predict high school students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day?	H4: The more students feel appreciated by their teachers on the present day (t), the higher their intrinsic motivation the next day (t+1). H5: The more students feel appreciated by their teachers on the present day (t), the higher their subjective well-being the next day (t+1). H6: The more students feel appreciated by their teachers on the present day (t), the higher their school satisfaction the next day (t+1). H7: The more students feel appreciated by their teachers on the present day (t), the higher their self-efficacy the next day (t+1).

Correlative Analyses

In line with hypothesis H1, feeling appreciated on a daily level was positively related to students' global self-esteem at T2 ($r = .39, p < .001$). As expected in H2, students who experienced more daily appreciation reported lower daily stress levels ($r = -.16, p < .001$). Strengthening hypothesis H3, higher global self-esteem on T1 was negatively related to students' daily perceived stress ($r = -.16, p < .001$). Table 2 shows all correlations between the three constructs. Additionally, correlative analyses for all variables of interest are reported in Appendix B as well.

Table 2*Pearson Product-Moment Correlations – Testing the Assumptions of the SOS Theory*

	1	2	3	4	5	6	7	8
T1 - EASI	–							
T1 - Stress	-.40**	–						
T1 - Self-Esteem	.43**	-.45**	–					
Diary - EASI	.69**	-.37**	.40**	–				
Diary - Stress	-.16**	.52**	-.16**	-.16**	–			
T2 - EASI	.72**	-.40**	.39**	.81**	-.26**	–		
T2 - Stress	-.27**	.61**	-.33**	-.26**	.68**	-.35**	–	
T2 - Self-Esteem	.35**	-.43**	.61**	.39**	-.25**	.42**	-.46**	–

Note. The table shows two-sided Pearson product-moment correlations. Diary variables were aggregated over the entire diary period. * $p < .05$, ** $p < .01$.

Multilevel Analyses – EA-SI as Predictor for Students' Daily Intrinsic Motivation

The data was suited for multilevel analysis since the intercept only model's (M_0) ICC was .62 and therefore above the cut off of .05 (Bressoux, 2020). Comparing M_0 to the predictor model (M_1), the AIC and BIC indicated a better fit for M_1 (M_0 $AIC = 4066.75$, $BIC = 4082.48$; M_1 $AIC = 3876.42$, $BIC = 3944.36$). Time and gender were not significant, as demonstrated by the confidence intervals including an effect estimate of 0. Age was a significant predictor. With increasing age students reported lower intrinsic motivation. EA-SI significantly predicted students' intrinsic motivation above age with a point estimate of $\beta_{20} = 0.27$. The variance explained by fixed effects was $R_m^2 = .21$. The variance explained by both fixed and random effects was $R_c^2 = .66$. Consequently, we accept hypothesis H4. The more students felt appreciated by their teachers on the present day, the higher their intrinsic motivation the next day.

Multilevel Analyses – EA-SI as Predictor for Students' Daily Subjective Well-being

The data was suited for multilevel analyses with an $ICC = .57$. The comparison of the AIC and BIC of both models pointed towards a better fit for M_1 (M_0 $AIC = 3820.24$, $BIC = 3835.98$; M_1 $AIC = 3641.66$, $BIC = 3709.60$). Time and age significantly predicted daily fluctuations in subjective well-being, gender did not. With increasing time and age participants subjective

well-being decreased. After accounting for all covariates, EA-SI significantly predicted students' well-being the next day with a point estimate of $\beta_{20} = 0.29$. Variance explanation was $R_m^2 = .23$ and $R_c^2 = .61$. Therefore, we accept hypothesis H5. The more students felt appreciated by their teachers on the present day, the higher their subjective well-being on the next day.

Multilevel Analyses – EA-SI as Predictor for Students' Daily School Satisfaction

M_0 had an $ICC = .59$. The AIC and BIC were better for M_1 (M_0 $AIC = 4116.46$, $BIC = 4132.20$; M_1 $AIC = 4032.59$, $BIC = 4100.53$). Time and gender were no significant predictors. Age significantly predicted school satisfaction. Older students reported significantly lower school satisfaction. EA-SI predicted students' school satisfaction with $\beta_{20} = 0.15$. When allowing for fixed effects only the variance explanation was $R_m^2 = .10$. When allowing for both fixed and random effects $R_c^2 = .61$. Accordingly, hypothesis H6 can be accepted. The more students felt appreciated by their teachers on the present day, the higher their school satisfaction on the next day.

Multilevel Analyses – EA-SI as Predictor for Students' Daily Self-Efficacy

The ICC was .51 for M_0 . AIC and BIC were better for the predictor model M_1 (M_0 $AIC = 4559.55$, $BIC = 4575.28$; M_1 $AIC = 4446.46$, $BIC = 4514.40$). With increasing time students' self-efficacy decreased significantly. Gender and age were no significant predictors. EA-SI significantly predicted students' self-efficacy the next day with $\beta_{20} = 0.17$. Fixed effects explained a variance of $R_m^2 = .03$. Variance explanation based on fixed and random effects explained $R_c^2 = .55$. Based on these results, we accept hypothesis H7. The more students felt appreciated by their teachers on the present day, the higher their self-efficacy on the next day. Table 3 shows the results and detailed metrics of all multilevel analyses.

Table 3*Summarized Effect Estimates of all Multilevel Analyses*

Outcome	Intrinsic Motivation	Well-being	School Satisfaction	Self-Efficacy
<i>Fixed Effects</i>				
Intercept	2.73 [2.33; 3.12] < .001	3.41 [3.06; 3.75] < .001	3.51 [3.09; 3.93] < .001	3.47 [3.03; 3.91] < .001
Age	-0.35 [-0.48; -0.21] < .001	-0.26 [-0.37; -0.14] < .001	-.30 [-0.46; -0.15] < .001	0.06 [-0.10; 0.22] .44
Gender	-0.08 [-0.37; 0.22] .61	0.04 [-0.21; 0.29] .75	0.07 [-0.27; 0.41] .68	0.10 [-0.24; 0.44] .56
Time	-0.01 [-0.03; 0.00] .07	-0.02 [-0.03; -0.004] .009	0.001 [-0.01; 0.01] .84	-0.02 [-0.04; -0.003] .02
EA-SI	0.27 [0.17; 0.36] < .001	0.29 [0.22; 0.36] < .001	0.15 [0.06; 0.24] .001	0.17 [0.06; 0.28] .002
<i>Random Effects</i>				
Intercept	1.81	1.31	1.89	1.88
Day	0.00	0.00	0.00	0.00
EA-SI	0.11	0.03	0.07	0.14
<i>Effect Size</i>				
R_m^2	.21	.23	.10	.03
R_c^2	.66	.61	.61	.55

Note. Age was mean-centered, gender was uncentered. Fixed effects are shown as point estimate β of the predictors. The parentheses denote the estimated 95% confidence intervals. Below the confidence intervals the significance level is shown. Random effects are shown as estimated variance. The effect sizes R_m^2 and R_c^2 are depicted.

Discussion

Key Findings

In this study, the construct Experienced Appreciation in Social Interactions and its theoretical framework, the Stress-as-Offense-to-Self theory (Semmer et al., 2007), were investigated in the school context. To examine the role of experienced teacher appreciation on a day-to-day basis while also testing for the reliability and validity of the constructs' operationalization, we applied a longitudinal diary design over four consecutive school weeks. Based on the results, we will discuss the reliability and validity of the EA-SI School Scale (Q1), the replicability of the assumptions of the SOS theory (Q2), and the role of experienced teacher appreciation for students' daily school lives (Q3).

Q1 – Can EA-SI be reliably measured over time and can the assumed single-dimensional structure be replicated using the EA-SI School Scale?

The internal consistency of the EA-SI School Scale was excellent at both cross-sectional time points of measurement (Blanz, 2021). Despite noteworthy fluctuation on the individual level, the test-retest reliability implied acceptable stability between T1 and T2 and acceptable to good stability between the cross-sectional time points and the aggregated diary entries (Moosbrugger & Kelava, 2020). Considering all additional fit indices, the confirmatory factor analysis indicated a good model fit of the expected single-dimensional structure and, therefore, factorial validity. The additionally conducted exploratory factor analysis (see Appendix C) also supported the single-dimensional solution. Answering the first research question, the psychological construct of EA-SI could be reliably and validly measured in the school context using the EA-SI School Scale.

Q2 – Are the Assumptions of the SOS Theory Replicable in the School Context?

In line with the basic assumptions of the SOS theory (e.g., Semmer et al., 2007; 2019), students who felt more appreciated by their teachers on a daily basis reported higher global self-esteem. The effect size was moderate (Cohen, 1988). The more students' felt appreciated by their teachers on a day to day basis, the lower their daily stress. The effect size was small (Cohen, 1988). Higher global self-esteem was related to lower experienced stress on a daily level and with a small effect size (Cohen, 1988). Based on our findings, we can answer the second research question concluding that the theoretical assumptions of the SOS theory could be replicated in the school context. Experienced appreciation was strengthened as a boost for students' self-esteem, covarying with their stress perception while supporting the criterion validity of the EA-SI School Scale. Consequently, we accept the hypotheses H1 to H3.

Q3 – Does experienced teacher appreciation on the present day predict high school students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day?

Furthermore, the multilevel analyses based on students' diary entries pointed towards EA-SI as a valid predictor for all next-day outcomes. As expected, students who experienced more appreciation from their teachers on the present day reported higher intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day. The point estimate indicated a substantial increase in students' intrinsic motivation and subjective well-being as it indicated a moderate increase in school satisfaction and self-efficacy when increasing EA-SI by one scale unit on the present day.

Age was a significant predictor for three of the four outcomes. With increasing age, students reported lower intrinsic motivation, subjective well-being, and school satisfaction. Time was a significant predictor for students' well-being and self-efficacy. With the passage of time, students reported less well-being and less self-efficacy. There was no systematic variation within the dependent variables associated with students' gender. However, EA-SI remained a significant predictor when accounting for the covariates age, gender, and time.

When only focusing on the fixed effects (R_m^2), 21 % of variation within students' intrinsic motivation, 23% of their subjective well-being, and 10% of their school satisfaction were explained. When allowing for fixed and random effects, 66% of variance of students' intrinsic motivation, 61% of students' well-being, and 61% of students' school satisfaction were explained. When comparing the conditional R_c^2 with the marginal R_m^2 as recommended by Nakagawa and Schielzeth (2012), the predictors alone described as noteworthy part of the variance within the outcomes. Nonetheless, the explanation of variance within the outcomes was better when allowing for fixed and random effects highlighting the importance of modelling clustered data with appropriate methods. Although experienced appreciation significantly predicted students' self-efficacy, the explanatory value of the predictors was low with a R_m^2 of 3%. In comparison, the R_c^2 of 55% indicates that substantial variance was captured by random effects.

Hence, experienced appreciation from teachers was a significant predictor explaining variance within all four dependent variables on a day-to-day basis. Based on these results, we accept the hypotheses H4 to H7 and answer the third research question: The everyday appreciation students experienced from their teachers predicted their intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day (**Q3**).

Limitations and Implications for Future Research

Despite its strengths, such as contributing to a more congruent understanding and operationalization of experienced appreciation in the school context, testing the SOS theory in a new area of life by transferring it to the school context, and investigating the theoretically expected relations on a daily basis applying a longitudinal diary design, this study has several noteworthy limitations. In this section we will critically discuss these limitations, deriving explicit implications for future research.

First, this study should be interpreted as a first step in investigating EA-SI within the school context. To counter the replication crisis (Open Science Collaboration, 2015), future research should strive to replicate the findings in independent samples with similar participant compositions to strengthen the assumed relations. Since McGrath and Van Bergen (2015) showed that student-teacher interactions are an influential factor for students' lives from preschool to high school, EA-SI should also be investigated within different school types. Additionally, according to Triandis (2001), it is questionable whether findings within individualistic cultures (e.g., Germany) are generalizable to collectivistic cultures. Future research should test the assumed relations across different cultures and social systems.

While asking students about their experienced appreciation from teachers on a day-to-day basis represents a precious step towards more reliable results as compared to mere cross-sectional surveys, students had to aggregate all student-teacher interactions throughout the day when responding to the diary. This could have resulted in biasing the overall evaluation of one's experienced teacher appreciation on the present day based on extraordinarily positive/ negative

dyadic student-teacher interactions. Therefore, future research should consider applying more fine-grained monitoring methods allowing data collection on several occasions throughout the day. One possibility to monitor teacher appreciation more detailed could be the method of experience sampling (Niepel et al., 2022), using mobile devices to survey students' experiences in every single school lesson.

Third, this study focused on the appreciation students experienced from their teachers. Recent findings pointed towards the reciprocity of student-teacher interactions. For example, teacher enthusiasm did not only influence student enthusiasm, but vice versa (Lazarides & Schiefele, 2024). EA-SI was developed as a construct applicable to various types of interactions between social beings. In a next step other sources of EA-SI at school and its relevance for appreciation receivers' lives could be investigated. For example, teachers' experience of being appreciated by their students, colleagues, principals, or students' parents could be a future focal point. In line with the findings by Carstensen et al. (2021), pointing towards the relevance of experienced appreciation for university students' lives, future research could transfer EA-SI even further, testing it in the university context.

Fourth, over the period of four consecutive school weeks EA-SI showed an overall downward trend, meaning that the experience of feeling appreciated descriptively decreased while the school year progressed. In addition to time-specific variations, our results indicated age-specific variation regarding the outcomes. This is in line with the findings by Kleinkorres et al. (2023), who observed a significant decrease in students' satisfaction with school, enjoyment of school, and well-being on a much broader temporal level from grade five to grade nine. Future research should strive to further understand these downward trends unravelling the influence of age- and time-specific variables (such as varying difficulty, demands, and expectations on the school level, or the influence puberty and associated developmental challenges on the student level). In line with Kleinkorres et al. (2023) who pointed towards the

beneficial role of teacher autonomy support, EA-SI could be investigated as a protective factor for the observed downward trend as well.

Fifth, in line with basic ideas of communication theory (Schulz von Thun et al., 2014) and the results of the meta-analysis by Nurmi (2012), specific personality traits and/or student characteristics on the intrapersonal level could significantly influence encoding and interpreting supposedly appreciative messages and consequently the evaluation of feeling appreciated. In the current study, we did not control for influential variables like these. Future research should consider testing the role of such potential moderator and/or mediator variables.

Finally, all data was based on self-reports. Despite the benefits of diary studies (e.g., increased ecological validity, monitoring change over time, focusing on day-to-day experiences while reducing recall effects), future research should also focus on additional types of data (Podsakoff et al., 2003). For example, observational data or dyadically surveyed self- and peer-ratings could be collected as alternatives to self-reports. Moreover, types of data with higher internal validity such as students' health reports, sick days, school performance, class drop-out, or specific biomarkers (e.g., participants' day-to-day cortisol levels) could be collected.

Theoretical Implications

Based on the findings of this study, we can conclude that the assumptions of the SOS theory (Semmer et al., 2007) could be replicated in the context of school. The more students felt appreciated by their teachers, the higher their self-esteem and the lower their stress. This was true for cross-sectional as well as for longitudinally surveyed measures. Furthermore, experienced appreciation from teachers on the present day was positively related to students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day. Although we cannot derive any causal effects based on the time-lagged data structure and multilevel analyses, the results promote preliminary considerations on directional effects linking higher experienced appreciation to students' next day outcomes. These relations are in line with the theoretically expected connections between the investigated outcomes as well as

with previous findings in the occupational context (e.g., Pfister et al., 2020; Semmer et al., 2019). The findings of this study strengthen the SOS theory beyond the confinements of the occupational context, enhancing its nomological network (e.g., Semmer et al., 2025). Nonetheless, more research is pending to further understand the assumed mechanisms of action and causal relations regarding EA-SI and the theoretical framework of the SOS theory.

Practical Implications

First, the results of this study indicate that experiencing appreciation from teachers plays an important role for students' self-esteem as well as for their everyday stress perception, subjective well-being, school satisfaction, intrinsic motivation, and self-efficacy. Consequently, schools should educate their teachers about the relevance of experienced appreciation at school encouraging them to purposefully exchange daily appreciative messages with their students.

Second, the results of this study showed that experienced appreciation could be reliably and validly measured using the EA-SI School Scale. Teachers should be encouraged to counter the incongruency in what is meant by the term of appreciation by consistently applying EA-SI as a reliable and valid alternative. For example, teachers could answer the instrument to measure EA-SI with their students to get initial feedback regarding their student-teacher relationship in terms of experienced appreciation. While doing so they could raise awareness for the topic among their students initializing dialogue between appreciators and appreciation receivers. Teachers and their students alike could use the EA-SI School Scale to create a mutual understanding of appreciation, broaden their horizon on potential expressions of appreciation, evaluate their current experiences of feeling appreciated, and identify the manifestations of experienced appreciation most important to them. Using the EA-SI School Scale in this way must happen in a safe space and based on dialogue at eye level. Individual differences should not be neglected while strengthening student-teacher interaction. However, schools, teachers,

and students should keep in mind that such formats could only be of descriptive value since the development and validation of effective training programs are still under construction.

Third, teachers should be made aware of the observed downward trend of experienced appreciation from the beginning of the school year to the end of the four week period. While reflecting on their own contribution to the decline of experienced appreciation over time, teachers could be encouraged to elaborate potential actions to counter the trend. However, the observed downward trend should not be overestimated since more research is pending to further understand it in detail.

Conclusion

This study aimed to (1) transfer the construct EA-SI to the school context, measuring it reliably and validly using a new instrument, to (2) replicate the assumptions of its theoretical framework, the SOS theory, and to (3) investigate the role of experienced teacher appreciation for students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy. The results indicate that the construct of experienced appreciation from teachers can be reliably and validly captured using the EA-SI School Scale. The assumed uni-dimensionality of EA-SI was replicated. With regards to the SOS theory, the expected relations between appreciation, stress and self-esteem were replicable in the school context as well. Moreover, experienced appreciation from teachers was a significant predictor of students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy on a day-to-day basis and beyond the influence of age, time, and gender. Although the applied longitudinal design allowed for preliminary considerations on directional relations, the applied design and statistical analyses did not permit to draw causal conclusions. More research must follow to replicate the findings and understand the underlying mechanisms of action facilitating appreciative student-teacher interactions.

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Appendix

Appendix A – The EA-SI School Scale

Appendix A.1 – The EA-SI School Scale (German)

Wie sehr fühlst du dich durch deine Lehrer/innen wertgeschätzt? Denke nicht an eine/n bestimmte/n Lehrer/in, sondern überlege, wie sehr du dich im Allgemeinen durch all deine Lehrer/innen, die du im Unterricht hast, wertgeschätzt fühlst.

1. Meine Lehrer/innen nehmen meine Einwände ernst.
2. Meine Lehrer/innen zeigen mir, dass Sie meine Stärken kennen und schätzen.
3. Meine Lehrer/innen geben mir Verantwortung für Dinge, die für die ganze Klasse wichtig sind.
4. Meine Lehrer/innen betonen immer wieder, dass sie sich auf mich verlassen können.
5. Ich spüre deutlich, dass meine Lehrer/innen meine Arbeit zu schätzen wissen.
6. Ich fühle mich mit all meinen Erfolgen von meinen Lehrer/innen gesehen.
7. Meine Lehrer/innen zeigen mir, dass sie sehen, was ich alles leiste.
8. Manchmal fühle ich mich von meinen Lehrer/innen unter Druck gesetzt.
9. Meine Lehrer/innen zeigen mir, dass ich viel wert bin.
10. Meine Lehrer/innen haben Interesse an dem, was ich zu erzählen habe (persönlich und fachlich)
11. Meine Lehrer/innen würdigen mein Engagement, indem sie mich in der Schule fördern (z.B. durch faire Noten, Unterstützung im Unterricht, verantwortungsvolle Aufgaben, usw.).
12. Meine Lehrer/innen geben sich Mühe, um ein Arbeitsumfeld zu schaffen, in dem ich gut arbeiten kann (z.B. schöner Klassenraum, ruhige Arbeitsumgebung, angenehme Aufenthaltsbereiche, gemeinsame Ausflüge, usw.).
13. Ich kann mit meinen Lehrer/innen über persönliche und emotionale Themen sprechen.
14. Meine Lehrer/innen geben mir das Gefühl, dass ich ein wichtiger Teil der Klasse bin.

Trifft nicht zu	Trifft zu
☐	☐

Appendix A.2 – The EA-SI School Scale (English Translation)

How appreciated do you feel by your teachers? Don't think of a specific teacher, instead consider how appreciated you feel in general by all of your teachers.

1. My teachers take my concerns seriously.
2. My teachers show me that they know and value my strengths and skills.
3. My teachers give me responsibility for things that are important to the entire class.
4. My teachers repeatedly emphasize that they can rely on me.
5. I clearly feel that my teachers appreciate my work.
6. I feel that my teachers acknowledge all my achievements.
7. My teachers show me that they recognize everything I accomplish.
8. Sometimes I feel pressured by my teachers.
9. My teachers show me that I am valued.
10. My teachers are interested in my opinions (both personally and academically).
11. My teachers recognize my dedication by supporting me at school (e.g., through fair grades, support in class, responsible tasks, etc.).
12. My teachers make an effort to create a work environment I can thrive in (e.g., a nice classroom, a quiet work environment, comfortable common areas, group field trips, etc.).
13. I can talk to my teachers about personal and emotional issues.
14. My teachers make me feel like I am an important part of the class.

Does not apply			Does apply		
☐	☐	☐	☐	☐	☐

Appendix A.3 – The EA-SI School Scale (short; German)

Alle Fragen, die jetzt noch kommen, beziehen sich nun auf deinen gestrigen Schultag.

Bitte versuche dich so gut du kannst an deinen Schultag gestern zu erinnern, um die Fragen zu beantworten. Antworte ehrlich und konzentriert.

WICHTIG: Falls heute Montag ist, dann beantworte die Fragen bitte für den vergangenen Freitag; deinen aktuellsten Schultag vor dem Wochenende!

GESTERN/ AM VERGANGENEN FREITAG ... "

1. ... haben meine Lehrer/innen mich spüren lassen, dass ich viel wert bin.
2. ... haben mir meine Lehrer/innen gezeigt, dass sie sehen, was ich alles leiste.
3. ... haben mir meine Lehrer/innen gezeigt, dass sie meine Stärken kennen und schätzen.
4. ... hatten meine Lehrer/innen Interesse an dem, was ich zu erzählen habe (persönlich und fachlich).

Trifft nicht zu			Trifft zu		
☐	☐	☐	☐	☐	☐

Appendix A.4 – The EA-SI School Scale (short; English Translation)

All following questions refer to yesterday's school day.

Please try your best to remember your school day yesterday so you can answer the questions. Answer honestly and carefully.

IMPORTANT: If today is Monday, please think of last Friday—your most recent school day before the weekend!

YESTERDAY/LAST FRIDAY ... "

1. ... my teachers made me feel that I am valued.
2. ... my teachers acknowledged my achievements.
3. ... my teachers showed me that they know and value my strengths and skills.
4. ... my teachers were interested in my opinions (both personally and academically).

Does not apply			Does apply		
☐	☐	☐	☐	☐	☐

Appendix B – Descriptives and Correlative Analyses

Table B.1

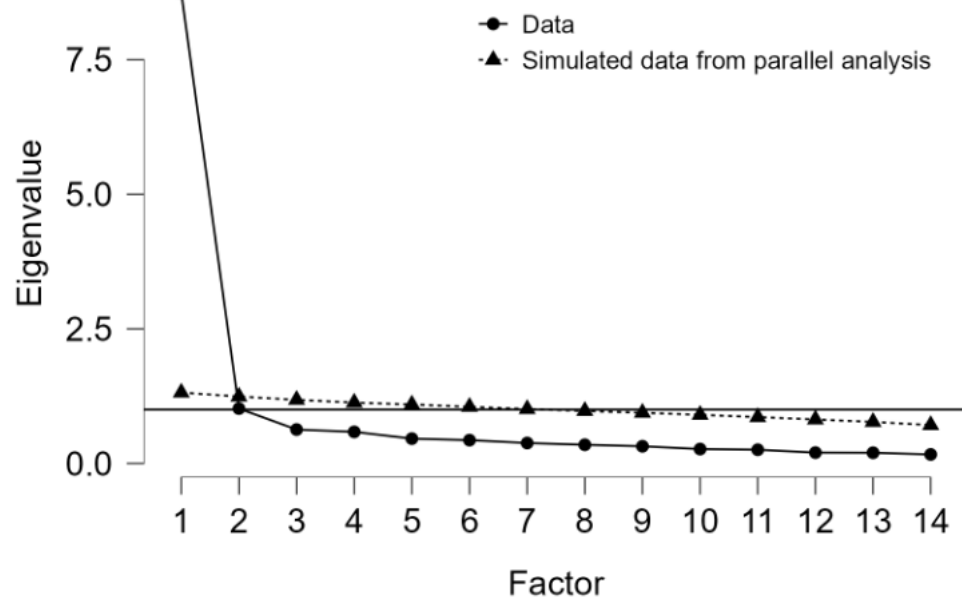
Pearson Product-Moment Correlations

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T1 - EASI	3.41	1.14	(.94)																	
T1 - Intrinsic motivation	3.31	1.22	.58**	(.87)																
T1 - Selfesteem	4.21	1.22	.43**	.43**	(.86)															
T1 - Stress	3.14	1.34	-.40**	-.39**	-.45**	(.83)														
T1 - Selfefficacy	4.07	1.12	.35**	.51**	.36**	.36**	(.83)													
T1 - Wellbeing	4.42	1.09	.42**	.45**	.51**	.30**	.30**	(.91)												
T2 - EASI	3.30	1.27	.72**	.48**	.39**	-.40**	.42**	.39**	(.95)											
T2 - Intrinsic motivation	3.21	1.24	.50**	.67**	.39**	-.43**	.42**	.39**	.54**	(.87)										
T2 - Selfesteem	4.08	1.33	.35**	.24**	.61**	-.43**	.30**	.38**	.42**	.41**	(.89)									
T2 - Stress	3.35	1.23	-.27**	-.22**	-.33**	.61**	-.30**	-.47**	-.35**	-.34**	-.46**	(.86)								
T2 - Selfefficacy	4.21	1.14	.23**	.31**	.30**	-.28**	.57**	.34**	.31**	.42**	.37**	.29**	(.83)							
T2 - Wellbeing	4.35	1.34	.36**	.24**	.44**	-.27**	.10	.40**	.30**	.34**	.42**	-.37**	.07	(.95)						
Diary - EASI	3.14	1.34	.69**	.48**	.40**	-.37**	.23**	.36**	.81**	.54**	.39**	-.26**	.26**	.34**	—					
Diary - Intrinsic motivation	3.43	1.32	.52**	.69**	.49**	-.50**	.38**	.50**	.52**	.71**	.38**	-.33**	.36**	.37**	.52**	—				
Diary - Stress	3.15	1.26	-.16**	-.14**	-.16**	.52**	-.21**	-.38**	-.26**	-.19**	-.25**	.68**	-.15**	-.27**	-.16**	-.27**	—			
Diary - Selfefficacy	3.89	1.23	.33**	.30**	.30**	-.21**	.33**	.22**	.27**	.40**	.26**	-.19**	.39**	.21**	.33**	.35**	-.07	—		
Diary - Wellbeing	4.15	1.04	.47**	.50**	.57**	.52**	.36**	.74**	.49**	.54**	.47**	-.49**	.36**	.67**	.47**	.70**	-.33**	.38**	—	
Diary - School satisfaction	3.90	1.23	.56**	.57**	.52**	.49**	.35**	.52**	.58**	.67**	.46**	-.41**	.37**	.51**	.56**	.74**	-.34**	.39**	.74**	—

Note. The arithmetic mean (*M*), standard deviation (*SD*) and correlation coefficient for all Pearson product-moment correlations are reported. The parantheses show the internal consistency (α) of all measures. The Likert scales ranged from a minimum of 1 to a maximum of 6. The significance levels are denoted with * $p < .05$ and ** $p < .01$.

Appendix C – Exploratory Factor Analysis

Scree plot



Note. The scree plot and parallel analysis for the exploratory factor analysis in T1 are depicted. Results indicate a single-factor solution.

5. General Discussion

In line with the well-known hourglass model in scientific writing (e.g., Schulte, 2009), I will start this section by discussing the key findings of the three original studies to answer the guiding research questions of the overarching PhD project. Subsequently, methodological strengths and limitations will be contrasted to deduce potential focal points for future research. Finally, fundamental theoretical and practical implications will be outlined, followed by a brief conclusion.

5.1 The Unique Contribution of the Three Original Studies to the PhD Project

Before discussing the essential findings, a short overview of the three original studies will be given clarifying their contribution to the PhD project. As mentioned before, four research questions guided the overarching PhD research project:

- (RQ1)** How can the experience of feeling appreciated by another human being be defined, combining different understandings of appreciation in one integrative construct?
- (RQ2)** Can EA-SI be objectively, reliably, and validly measured using a new instrument that is not only easily applicable but also statistically tested?
- (RQ3)** Are the theoretical assumptions of the Stress-as-Offense-to-Self theory valid and replicable across multiple samples and contexts of human lives?
- (RQ4)** Are the relations assumed by the SOS theory observable beyond the confinements of cross-sectional designs?

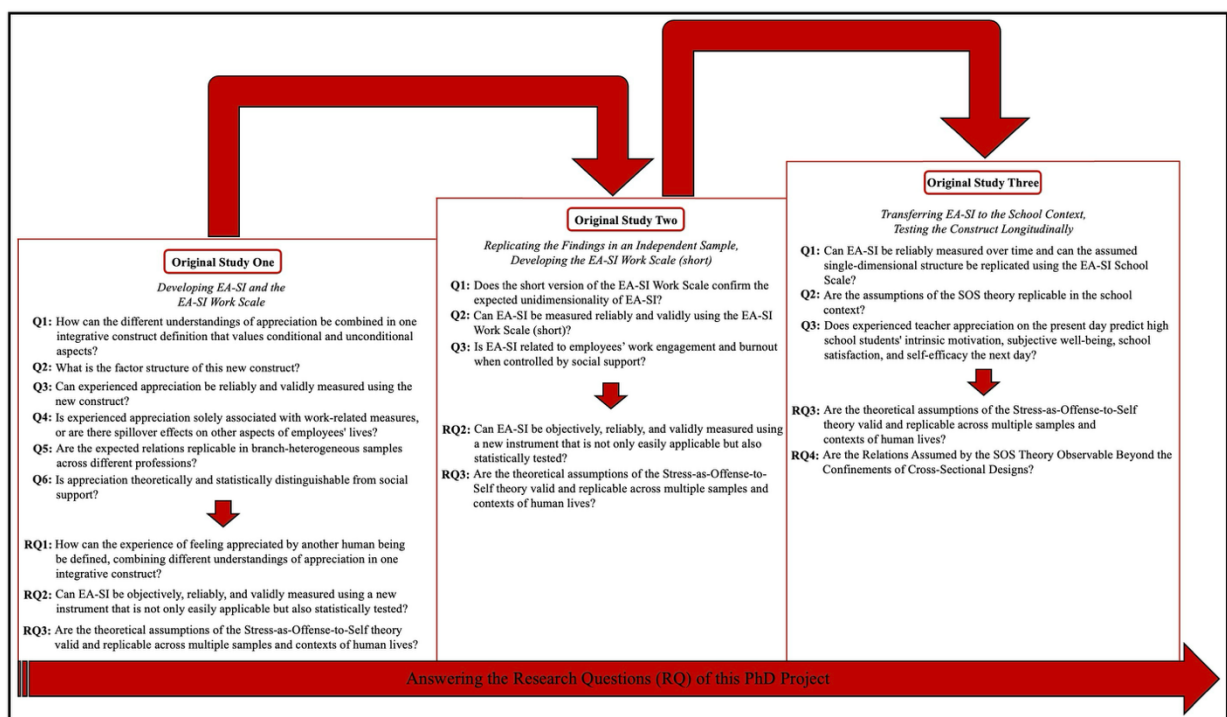
Each original empirical study – driven by its own research questions – provided a unique contribution to answering these questions. The first original study was focused on developing the construct of EA-SI, validating its operationalization, and statistically testing the assumptions of the SOS theory in the occupational context, while it primarily contributed to answering the PhD project's research questions RQ1 to RQ3.

The second original empirical study strived to consolidate and replicate the previously gained insights in another independent sample in the occupational context aiming to counter the phenomenon of replication crisis in psychological science (Open Science Collaboration, 2015). Moreover, a more time-economic instrument to measure EA-SI was developed while the existing knowledge and model were further extended by investigating the relation between EA-SI and the appreciation receivers' burnout. The second original study aided to answer RQ2 and RQ3.

In the third original empirical study, the construct of EA-SI, its operationalization, and the theoretical model were transferred to the school context. EA-SI was not only investigated cross-sectionally, but also longitudinally over a period of four weeks, testing the influence of daily experienced appreciation from teachers on students' next-day outcomes. Thus, the third original study was primarily focused on answering RQ3 and RQ4. Figure 2 shows the interrelatedness of the three original studies and their contribution to this PhD project in one concise graphic.

Figure 2

Connecting the Three Original Empirical Studies – Contribution to the PhD Research Project



5.2 Essential Findings – Answering the Research Questions of the PhD Project

Subsequently, the guiding research questions of the PhD research project will be answered based on the insights of the original studies. To do so, the research questions will be outlined stepwise while presenting the essential findings of all three original empirical studies.

5.2.1 How Can the Experience of Feeling Appreciated by Another Human Being be Defined, Combining Different Understandings of Appreciation in One Integrative Construct?

The construct of EA-SI was developed considering different levels of theoretical depth (Meehl, 1967) while incorporating a multitude of manifestations of appreciation based on scientific literature (e.g. Kuoppala et al., 2008; Rogers, 1991; Siegrist, 2016; Stocker et al., 2014; White, 2016). Emphasizing the relevance of an in-depth elaborated model, the new construct was enclosed by a detailed set of labels and communicational premises (Adair, 2009; Schulz von Thun; 2014; Watzlawick et al., 2016), and by the theoretical framework of the SOS theory (Semmer et al., 2007) bridging theory and practical applicability.

This integrative definition of EA-SI has been consistently applied across all three original studies. The construct was theoretically and statistically distinguished from social support in the first and second original study. Additionally, in the second original study, a detailed overview on different understandings of the psychological constructs of appreciation was provided (e.g., Bregenzer et al., 2022; Döring-Katerkamp & Rohrmeier, 2016; van Quaquebeke & Eckloff, 2010) while theoretically and methodologically comparing EA-SI with these understandings. In line with previous findings (e.g., Semmer et al., 2019), the experience of being appreciated significantly predicted the investigated outcomes (e.g. work satisfaction, work engagement, burnout) beyond the influence of social support. Moreover, in most analyses EA-SI remained the only significant predictor indicating that social support could also be understood as subsumed to the construct of experienced appreciation rather than vice versa. In the third original study, EA-SI was validated in an entirely different context of human life: the

school context. The integrative definition was again strengthened in this new context and its associated sample as well.

As implied by exploratory (O'Connor, 2000) and confirmatory (Hu & Bentler, 1999) factor analyses, EA-SI is one-dimensional in structure, regardless of the multitude of incorporated manifestations. This is in line with previous findings and the understanding of appreciation as an autonomous construct with one dimension in the occupational context (e.g., Pfister et al., 2020; Semmer et al., 2007; Stocker et al., 2014), and in the educational context (e.g., Carstensen et al., 2021).

5.2.2 Can EA-SI be Objectively, Reliably, and Validly Measured Using a New Instrument That is Not Only Easily Applicable but Also Statistically Tested?

In the first original study, the aforementioned definition of EA-SI was put to the test deducing a large set of items from literature. Testing this set of items against psychometric quality criteria (Bortz & Döring, 2006; Moosbrugger & Kelava, 2008; Pospeschill, 2013) in the occupational context, resulted in the EA-SI Work Scale with a total of 15 items. One version was developed for colleagues and another for direct supervisors as appreciators including 15 items each. In the second original study, the EA-SI Work Scale (short) was developed as a more time-efficient alternative to the original. The new instrument with a total of four items was derived in a first sample and then validated in a second independent sample in the occupational context. In the third original study, the EA-SI School Scale, including fourteen items, and the EA-SI School Scale (short), including four items, were developed as adaptations of the original instrument. To fit the school context, one item that focused on "adequate material gifts" had to be excluded since it did not seem to be adequate to measure experienced appreciation from teachers. Both instruments were put to the test by applying them cross-sectionally and longitudinally.

The online-based questionnaires indicated high objectivity of all four instruments (Treiblmaier, 2010). Throughout all three original studies, both the full-length instruments as

EXPERIENCED APPRECIATION IN SOCIAL INTERACTIONS

well as the short scales showed excellent internal consistency (Blanz, 2021). The test-retest reliability of the instrument was good in the work context (original study one) and good to acceptable in the school context (original study three; Moosbrugger & Kelava, 2020).

Based on the chosen procedures to develop the original instruments, high content validity was implied. EA-SI was positively related to other measures of appreciation (original study one and two), as it was also positively related to interpersonal justice (original study one), and negatively related to workplace ostracism (original study one), indicating high convergent construct validity. Moreover, the EA-SI Work Scale was not significantly related to participants' political opinions which strengthened the instruments' discriminant validity (first and second original study). Across all three original studies the one-factor solution was supported implying high factorial validity of the instruments. Finally, the analyses of the original study one to three pointed in the direction of high criterion validity for all four instruments. EA-SI was significantly related to various outcomes of the appreciators' everyday lives. In most analyses, the prediction exceeded the influence of social support what further indicated incremental validity of the instruments (original study one and two). The exact relations between EA-SI and the specific outcomes will be discussed in more detail in the following section when answering the third research question.

Combining all three original empirical studies, this PhD project results in the development of two new instruments to measure experienced appreciation in the occupational context and two instruments to measure the construct in the school context. Consequently, the second research question can be answered: EA-SI can be objectively, reliably, and validly measured using the EA-SI Work Scale and the EA-SI Work Scale (short) in the occupational context and the EA-SI School Scale and the EA-SI School Scale (short) in the school context. Reliability and validity of the instrument(s) were strengthened across all three original studies.

5.2.3 Are the Theoretical Assumptions of the Stress-as-Offense-to-Self Theory Valid and Replicable Across Multiple Samples and Contexts of Human Lives?

In the first original study, higher experienced appreciation from colleagues and direct supervisors was positively related to employees' global self-esteem and negatively related to their perceived stress. The higher employees' self-esteem was, the lower was their stress. This was true for both independent samples. In the second original study, these findings were replicated when testing the short scale in another independent sample in the occupational context. In the third original study, the assumptions of the SOS theory were then tested in the school context. Higher experienced appreciation from teachers was also positively related to students' self-esteem while it was negatively related to their general stress perception. The higher their self-esteem was, the lower was their perceived stress.

Across all three original studies, the effect sizes were predominantly small to moderate (Cohen, 1988). Interpreting the strength of these effect sizes against the background of the applied field study designs, experienced appreciation in social interactions can be understood as substantially related to the appreciation receiver's self-esteem and stress perception in both the work and the school context.

Replicating the assumptions of the SOS theory would not only mean focusing on the aforesaid relations but also testing for various outcomes being influenced by the dynamics between boosts, self-esteem, and perceived stress (e.g., Semmer et al., 2019). To test the direct relations between EA-SI and different outcomes in the first and second original study hierarchical linear regressions were computed while in the third study multi-level analyses were calculated.

In the first original study, participants reported higher work satisfaction, work engagement, and overall life satisfaction the more they felt appreciated by their colleagues. Higher experienced appreciation from direct supervisors was related to higher work satisfaction and work engagement and to lower emotional exhaustion. In the second original study, these

insights were further strengthened in another independent sample at work. Again, EA-SI was positively related to employees' work engagement. Moreover, experienced appreciation was negatively related to employees' burnout. This was true for colleagues and direct supervisors as appreciators. In the third original study, EA-SI and its theoretical framework were tested in the school context investigating the relations between experienced appreciation from teachers (appreciators) and high school students' (appreciation receivers') outcomes. Feeling appreciated by their teachers on the present day significantly predicted students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy on the next day. When increasing the experienced appreciation from teachers by one scale unit on the present day, students' next-day outcomes increased noteworthy (see point estimates; original study three). EA-SI remained a significant predictor of all four outcomes beyond the influence of the co-variables age, gender, and time.

The effect sizes for the work-related outcomes in the original studies one and two were moderate to high (Cohen, 1988). As discussed in the first original study, the relations between EA-SI and appreciation receivers' overall life satisfaction were small in effect size (Cohen, 1988). Since there are no fixed cut offs for R_m^2 and R_c^2 , the two metrics have to be interpreted comparatively (Nakagawa & Schielzeth, 2012). When comparing the marginal R_m^2 to the conditional R_c^2 , the variance explanation of students' next-day outcomes based on fixed effects alone was noticeably smaller than the explanation based on fixed and random effects (original study three). Nonetheless, the predictors alone explained 10% of variance in students' school satisfaction, 21% in intrinsic motivation, and 23% in subjective well-being. The variance in students' self-efficacy, on the other hand, was only explained by 3% based on fixed effects alone which indicated smaller effect size.

Consequently, the third research question can be answered: In line with previous findings (e.g., Auer et al., 2024; Pfister et al., 2020; Semmer et al., 2019), the theoretical assumptions of the SOS theory were replicable in all three original empirical studies. EA-SI

can be understood as a boost to the human self-esteem while also being directly related to the appreciation receivers' stress perception. Higher self-esteem related to lower levels of perceived stress. In line with prior insights in the occupational context (e.g., Pfister et al., 2020; Teo et al., 2021; Muntz & Dormann, 2020) and in the school context (e.g., Kostenius & Bergmark, 2016; Aldrup et al., 2018; Carstensen et al., 2021), EA-SI was also a significant predictor of various outcomes across all investigated samples. Investigating the association between EA-SI and the appreciation receivers' global self-esteem, general stress perception, overall life satisfaction, and subjective well-being descriptively pointed towards potential spillover (e.g., Liu et al., 2020) between different areas of humans' lives.

5.2.4 Are the Relations Assumed by the SOS Theory Observable Beyond the Confinements of Cross-Sectional Designs?

As discussed in more depth in the prior section, the results of all three studies strengthened the assumptions postulated by the SOS theory. In the third original study these assumptions were not only transferred to the school context but also tested within a longitudinal diary over four consecutive weeks. Feeling appreciated by one's teachers on a daily basis was positively related to students' self-esteem at the end of the four week period while it was negatively related to their daily stress perception. As expected, lower self-esteem at the beginning of the four weeks was associated with higher stress throughout the diary period. As outlined in great detail in the previous section, experienced appreciation from teachers on the present day was a significant predictor for students' intrinsic motivation, subjective well-being, school satisfaction, and self-efficacy the next day.

Hence, adding new insights to the limited number of studies investigating the expected relations within the SOS theory based of daily observations (e.g., Stocker et al., 2014), the fourth research question can be answered: The theoretical assumptions of the SOS theory could not only be observed within the confinements of cross-sectional designs but also on a day-to-day basis. Although these results could inspire preliminary considerations on directional effects

between EA-SI and the investigated outcomes, no causal conclusions can be drawn. Figure 3 sums up all research hypotheses tested across the three original studies.

Figure 3

Summary of the Research Questions and Hypotheses of all Three Original Studies



5.3 Methodological Strengths

The current PhD research project strived to counter each and every aspect of the aforementioned research gap not only based on in-depth theoretical considerations but also with regards to the investigated samples, applied designs, and applied statistical analyses while adhering to the standards of ethical and open science. Hence, the methodological strengths supporting the scientific contribution of this PhD project will be outlined.

5.3.1 Integrative Construct Development

Throughout the course of three complementary original studies, a versatile in-depth elaborated definition of experienced appreciation in social interactions has been developed and

validated. Instead of forcing yet another disjointed construct creation on the scientific community, the psychological construct of EA-SI is based on a multitude of different manifestations of experienced appreciation rooted in scientific literature. Not only has the definition of EA-SI been elaborated in detail, but the construct is also supplemented by a structured modeling of the involved interaction partners, interactional signal channels (e.g., Adair, 2009) and basic assumptions on human communication (Watzlawick et al., 2016; Schulz von Thun et al., 2014). The expected relevance of EA-SI for humans' everyday lives is not only deduced from empirical findings but also explained by a fixed set of laws and prepositions, known as nomological network (Cronbach & Meehl, 1955; Semmer et al., 2025) integrating the SOS theory as theoretical framework (Semmer et al., 2007). This procedure of in-depth developing EA-SI and its model based on theoretical and methodological considerations while also empirically testing the postulated assumptions in all three original studies and across two different areas of human lives represents a major methodological strength of this PhD project.

5.3.2 Development of the Instruments and Psychometric Quality

Based on the integrative definition of the construct, the EA-SI Work Scale was developed as a reliable and valid operationalization. When deducing the supposed manifestations of the latent variable, the items of the instrument were not developed intuitively or disjunct from existing scientific knowledge but incorporated theoretical considerations and empirical findings. Over the course of three original empirical studies the EA-SI Work Scale, the EA-SI Work Scale (short), the adapted EA-SI School Scale, and its short version were developed. Each instrument was developed aiming to reflect the integrative built and the definitory multitude of the different manifestations in each and every of its items. Moreover, item selection was supported by established psychometric criteria in scale construction (Bortz & Döring, 2006; Moosbrugger & Kelava, 2008; Pospeschill, 2013) and innovative approaches such as applying large language models (Open AI, 2024).

All instruments to measure EA-SI were tested for reliability and validity in detail according to test-theoretical standards (Moosbrugger & Kelava, 2020) instead of applying them without ensuring their quality. All other instruments to measure the outcomes of interest were also chosen based on methodological considerations demanding good psychometric quality, reliability, and validity. Due to the standardized online-based questionnaire format, the instruments to measure EA-SI can not only be easily applied and interpreted but were also developed with an emphasis on high objectivity and ecological validity (Treiblmaier, 2010).

5.3.3 Countering the Replication Crisis – Consolidating the Knowledge on Appreciation

This PhD research project contributes to countering the replication crisis (Open Science Collaboration, 2015) by testing the theoretically assumed relations between experienced appreciation, self-esteem, perceived stress, and several outcomes of interest across multiple independent samples. The results were replicated in the occupational context and in the school context. While exceeding the boundaries of a single area of human life, the assumed relations were both tested cross-sectionally and longitudinally. Across all three original studies, the results of the statistical analyses indicated significant interconnections between the investigated constructs, strengthening existing findings on the relevance of experienced appreciation at work (e.g., Pfister et al., 2020; Stocker et al., 2014; White, 2016) and at school (e.g., Eckert et al., 2025; Kostenius & Bergmark, 2016; Krane et al.; 2017). Hence, this PhD project contributed to countering the replication crisis while further expanding the existing knowledge on experienced appreciation beyond the limitations of a single life area or cross-sectional design.

5.3.4 Samples and Generalizability

Not only were the relations tested in various independent samples, in addition, this PhD project strived to build its results on samples with versatile participant compositions. In the occupational context, the expected relations were tested in highly diverse samples with regard to different industries and age groups, thus implying high generalizability to the overall population of employed individuals. In the school context, the sample included high school

students from grades five to nine to increase generalizability to this population as well. In addition, the applied field study designs based on the heterogeneous sample compositions (Kihlstrom, 2021) and the applied online-based questionnaires (Treiblmaier, 2010) further pointed towards high ecological validity across all three original studies.

5.3.5 Ethical Standards and Open Science

Finally, this PhD project made it a priority to adhere to the standards of ethical and open science (e.g., Center of Open Science, 2026). All studies were evaluated and approved by independent ethical committees prior to data collection. The scientific hypotheses and statistical analyses of the original studies were preregistered where possible. All studies contained a dedicated section, named openness and transparency, clarifying specific methodological procedures and aspects of open science. The data of all three original studies was published using the data repository by the Open Science Framework. All statistical analyses were computed using either the open source software JASP (JASP Team, 2024) or R (R Core Team, 2025) and the RStudio environment (Posit team, 2025). All published or submitted original studies, instruments, and materials have been or will be shared with the scientific community via open access to ensure low-threshold accessibility for researchers and practitioners alike.

5.4 Methodological Limitations and Implications for Future Research

In line with the understanding of productivity in science (e.g., Bortz & Döring, 2016; Shaughnessy et al., 2014), this PhD project did not only answer important questions but also simultaneously produced new questions pending to be answered. In the following section, limitations of the current PhD research project will be outlined to guide future research.

5.4.1 Samples and Interaction Partners

Although this research project tested the assumed relations across several independent samples and contexts of human life, it is still limited to the coincidentally drawn samples. To further counter the replication crisis (Open Science Collaboration, 2015), the results should be (1) tested again in the same contexts and for the same groups of appreciators and appreciation

receivers but in independent samples. Hence, the stability and generalizability of the findings would be further consolidated.

Referring to Triandis (2001), it should be questionable whether psychological insights gained within predominantly individualistic cultures are generalizable to predominantly collectivistically shaped cultures. Since the results of this PhD project are limited to German samples, future research should validate EA-SI, its operationalizations, and theoretical framework beyond the limitations of individualistic cultures. When doing so, the instruments should also be translated to and validated in other languages. Moreover, future research should test the insights of this PhD project and the assumptions of the SOS theory (e.g., Semmer et al., 2019) for other constellations of interaction partners. Besides investigating completely new groups of appreciators such as clients (at work) or fellow students (at school), the different groups of interaction partners could also be tested with reversed roles. For example, direct supervisors and teachers could be investigated as appreciation receivers while their employees and students could be tested as appreciators. Hence, future research should (2) validate the insights of this PhD project in the same contexts but for different cultures, languages, and interaction partners.

Finally, the three original studies were limited to only two of many areas of human life. As aforementioned, EA-SI was developed to reduce the incongruence in defining and measuring experienced appreciation in social interactions beyond a single context. Following the example of the third original study, future research projects could transfer EA-SI, its theory, and operationalization even further, (3) putting them to the test in different areas of life altogether. For example, recent findings point towards experienced appreciation as a significant predictor of the social connection (Gordon & Diamond, 2023) and willingness to stay (Contu et al., 2025) in romantic relationships.

5.4.2 Design and Statistical Analyses

Although the statistical analyses in the work context provided precious insights on EA-SI and its theoretical framework and the multilevel analyses in the school context promoted preliminary assumptions on potential directional effects, the relations were tested correlatively not allowing for deducing any causal effects. Since Eronen and Bringmann (2021) postulated that testing for directional effects would be essential for developing viable, long-lasting theories, future research should apply designs and statistical analyses allowing for causal conclusions to further understand EA-SI and the SOS theory. For example, cross-lagged panel designs (CLP) could be used. Based on at least three different time points of measurement (Singer & Willett, 2003), CLP would allow researchers to compare the influence of two different variables on each other crosswise over time while applying structural equation modelling (Hemmerich, 2016).

Integrating the basic assumption by Schulz von Thun et al. (2014) that interaction partners have to encode and decode their messages when communicating with each other, specific personality traits or integrated values (e.g., Elsbach et al., 2026) could have systematically influenced how the appreciation receivers perceived and decoded the signals sent by the appreciators in the original studies. Variations in personality traits could also have influenced other latent variables relevant to the SOS theory such as the appreciation receivers' stress perception (Roloff et al., 2022). Although the premises of the SOS theory indicate that feeling appreciated should be an important boost to humans' self-esteem no matter their individual traits, future research should control for the moderating or mediating effect of personality traits or specific values. When doing so, future research could also investigate whether there are identifiable profiles of traits and characteristics in appreciation receivers. Applying statistical approaches such as latent profile analysis (Spurk et al., 2020), future research could test for specific latent subgroups of appreciation receivers being more likely to

feel appreciated, demanding appreciation in systematically different ways, or profiting more or less from the experience of feeling appreciated.

Moreover, the potential spillover between different areas of life (e.g., Liu et al., 2020) was only tested indirectly and, therefore, descriptively in this PhD project by testing the relations between EA-SI at work/ at school and constructs which incorporated information from more than a single context (e.g., life satisfaction, subjective well-being). Future research should investigate whether feeling appreciated in one area of life influences other areas in more systematic ways.

5.4.3 Instruments and Source of Data

Although only validated instruments were used and the tendency to choose neutral answers was eliminated by applying 10- or 6-point Likert scales with forced choice when surveying EA-SI, all three original studies are based on self-reported measures susceptible for various systematic answering tendencies (Podsakoff et al., 2003) and social desirability (Voss et al. 2014). Future research should consolidate the insights of this PhD project controlling for social desirability (e.g., Ströber et al., 1999) but also considering different data sources. Following the example of Auer et al. (2024), who showed a negative relation between experienced appreciation at work and the risk of coronary heart disease, future research could also survey biophysiological or blood markers (e.g., cortisol levels). Moreover, observational data (e.g. behavioral data, observed performance, comparison of self- and peer-ratings), self-monitoring (e.g., blood pressure measured with self-measuring wearables; Tomitani et al., 2022), or other not self-reported data (e.g., documented sick days, health reports, or school-registered grades) could be collected to measure potential outcomes while countering the risk of confounding and common method bias (Podsakoff et al., 2003). To increase the internal validity, the insights of this PhD research project could also be tested in experimental designs (e.g., laboratory studies).

Another limitation of the applied instruments was that the appreciation receivers had to aggregate across all more or less appreciative interactions with a specific group of appreciators

to synthesize a single-value evaluation. This procedure could have led to a loss of information due to memory effects (Podsakoff et al., 2003), but also could the overall evaluation of EA-SI for a specific group have been confounded by extremely appreciative or non-appreciative interactions with single appreciators. Future research should test the investigated interactions on a more fine-grained level applying methods such as experience sampling (Niepel et al., 2022). Surveying participants' experiences on a more situational level throughout the day (e.g. with mobile devices) could be promising approaches to reduce memory effects and the need to aggregate over a multitude of social interactions.

While the single-dimensional structure of EA-SI was validated across all three original studies based on the results of exploratory factor analyses (O'Connor, 2000) and the additional fit indices of the confirmatory factor analyses (Hu & Bentler, 1999), the χ^2 -Tests provided ambiguous results. Future research should further strengthen the assumed one-factorial structure by testing it whenever applying one of the instruments to measure EA-SI.

Finally, the results of this PhD project are limited to the appreciation receivers' experiences on the individual level without taking dyadic dynamics between appreciator and appreciation receiver into account. However, dyadic experiences of appreciation can increase the willingness to appreciate one's counterpart and vice versa, facilitating an upward spiral of mutual appreciation (Gordon et al., 2012). This PhD project leaves the question unanswered whether reciprocal dyadic dynamics would be replicable for experienced appreciation in social interactions at work or at school.

5.4.4 Systematic Manipulation

Although the results of this PhD project strengthened the relevance of experienced appreciation for various outcomes across different contexts of humans' lives, no conclusions on how to systematically manipulate the experience of feeling appreciated can be drawn. Future research should focus on developing tailored interventions to facilitate the experience of feeling appreciated in social interactions. Based on the understanding of EA-SI such training programs

should not only focus on one of two interaction partners but be bi-directionally focused on both the appreciator and the appreciation receiver.

To evaluate the effectiveness of such interventions, future research could apply randomized controlled trials (RCT) comparing a randomly assembled experimental group with a randomly selected control group (Kazdin, 2024). If possible, researchers and participants should be double-blinded, not knowing which of the interventions represents the treatment and which represents the control condition. From an ethical standpoint, a waiting control group should be used to ensure that participants in this group would also get the supposedly beneficial training after the experimentation phase is concluded (Berking & Rief, 2012).

However, when systematically manipulating the feeling of appreciation in social interactions the instrument's sensitivity to change must be further tested to validly measure intervention-based changes in EA-SI (Schuck & Zwingmann, 2003). Additionally, it remains unclear whether separate manifestations of EA-SI could be facilitated independently from each other or if all manifestations must be increased beyond a specific threshold (e.g., Rouder & Morey, 2009) to increase the overall experience of feeling appreciated.

Finally, it should be noted that over all three original studies EA-SI showed a negatively skewed distribution of data. On average participants reported higher values. When evaluating training programs in the future, their effectiveness should be tested against potential ceiling effects potentially confounding the supposed effectiveness of training programs (Garin, 2023). As previously outlined, additional data sources exceeding self-reported and potentially biased measures should be considered.

5.5 Theoretical Implications

Beyond providing new insights on the psychological construct of experienced appreciation in social interactions based on statistical analyses and empirical findings, this PhD project put great emphasis on theoretical considerations. Hence, several theoretical implications will be deduced from the findings of the original studies.

5.5.1 Strengthening and Enhancing the Nomological Network of the SOS Theory

As encouraged by Semmer et al. (2019), the phenomenon of appreciation has been theoretically elaborated and statistically tested as an autonomous psychological construct in great detail within the scope of this PhD project. Based on (1) the results of the three original empirical studies, (2) the theoretical considerations, and (3) the chosen procedures, the nomological network of the SOS theory was substantially strengthened. The basic assumptions of the theory and the EA-SI model were supported. EA-SI was a reliable and valid boost to the human self-esteem. It was directly related to the appreciation receiver's stress perception and predicted several outcomes of interest beyond the limitations of a single sample, context, or cross-sectional design. Referring to Semmer et al. (2025), more research should follow to consolidate the findings and clarify the directional effects between the constructs while continuously paving the way for the theoretical framework to becoming a full-grown (SOS) theory.

5.5.2 Countering the Theory Crisis in Psychology

As Eronen and Bringman postulated, (1) an investigated phenomenon must be adequately robust, (2) the chosen operationalizations must validly capture the tested variables, and (3) directional effects should be tested wherever possible to counter the theory crisis in psychological science. As requested, the investigated centerpiece of the SOS theory – the individual's self-esteem – can be understood as a phenomenon that is adequately stable to be tested across various fields of psychological research (e.g., Leary & Baumeister, 2000; Orth et al., 2018; Rosenberg et al., 1995). The applied operationalizations of appreciation receivers' global self-esteem (Ravens-Sieberer et al., 2000; von Collani & Herzberg, 2003) and general stress perception (Umucu et al., 2018; Fliege et al., 2001) represent valid measures of the investigated variables. Based on the results of the three original studies, the newly developed instruments to capture EA-SI can also be understood as valid operationalizations of the underlying variable. When transferring EA-SI to the school context, a diary design analyzing

time-lagged data was applied as a first step in the direction of investigating the model in this new context while inspiring preliminary considerations on directional effects. Hence, the results of the original studies strengthened the SOS theory while also countering the theory crisis.

5.5.3 Acknowledging Theory-Building as a Cornerstone of Psychological Science

Developing the integrative construct of EA-SI based on three different levels of theoretical depth acknowledged the value of in-depth theoretical integration of psychological constructs when investigating them in psychological science (Meehl, 1967). Integrating grand, middle-ranged, and applied theoretical considerations (e.g., Lewin, 1945; Merton, 1968), an elaborated model was created not only providing a versatile definition of the construct but also offering a complex set of prepositions explaining the involved interaction partners and assumed relations to which the scientific community can consistently refer to.

Instead of creating ever-new theories, and thus facilitating the theory crisis (Eronen & Bringmann, 2021), EA-SI was consistently built on the SOS theory as its theoretical framework when put to the test in the occupational and in the educational context. Referring to the idea that probabilistic science – significantly shaped by Sir Karl Popper – should make bold decisions and propose brave hypotheses which can be accepted but also falsified based on empirical findings, the somewhat brave decision to extract the SOS theory from its known surroundings and test it in the school context was not easily made but based on deep-reaching theoretical considerations (Shea, 2026). Hence, putting the SOS theory to the test at school should have contributed to facilitating both its lifespan and impact across different research domains in psychological science and, therefore, benefit the scientific community (Eronen and Bringmann, 2021). The procedure and insights of this PhD project could encourage fellow researchers to anchor their research in viable theories of various depth and propose bold hypotheses while incorporating the deeply rooted requirements proposed for psychological research as a probabilistic science (e.g., Shea, 2026). Facilitating progressive research that advances existing knowledge should not only qualify for a good theoretical approach in

comparison to regressive theories (Eysenck, 1987) but also benefit researchers and practitioners alike.

5.6 Practical Implications

Based on the findings of this PhD project not only theoretical implications but also valuable practical implications can be distilled. In the following sections, practical learnings for appreciators and appreciation receivers in the occupational and in the school context will be deduced.

5.6.1 The Practical Value of Defining and Investigating EA-SI in Psychological Science

The first practical learning inspired by this PhD research project is that feeling appreciated matters. Not only was the experience of feeling appreciated at work related to employees' self-esteem, stress perception, work engagement, and work satisfaction but also to their overall satisfaction with life, their emotional exhaustion, and their self-reported burnout (original study one and original study two). Moreover, feeling appreciated by one's teachers was related to students' self-esteem and stress while also predicting their next-day motivation, well-being, school satisfaction, and self-efficacy (original study three). The insight that experienced appreciation in social interactions matters not only from a philosophical standpoint (e.g., Jackson Brown, 2007; Gandhi, 2017) but also based on scientific findings could be used by practitioners, appreciators, and appreciation receivers from both investigated areas of life to raise awareness for the evidence-based relevance of feeling appreciated.

A second learning that can be drawn from this PhD project is that the experience of feeling appreciated can be coherently defined applying the integrative construct of EA-SI. Whenever focusing on experienced appreciation, practitioners (e.g., colleagues, direct supervisors, counselors) are encouraged to share, apply, and refer to the definition of EA-SI to counter potential uncertainties on what is meant when talking about the somewhat nebulous sensation of feeling appreciated. Consistently referring to EA-SI while raising awareness for

the versatility of the integrated expressions of appreciation could facilitate knowledge-based communication between all involved interaction partners due to a shared understanding.

5.6.2 The Practical Value of the Theoretical Framework of EA-SI

The EA-SI model integrates a complex network of communication-theoretical assumptions (Schulz von Thun et al., 2014; Watzlawick et al., 2016) while distinguishing between different interaction partners and channels of signaling. The SOS theory represents a viable and empirically tested (e.g., Stocker et al., 2014; Semmer et al., 2019) theoretical framework. However, the highly detailed model could be misunderstood as overly elaborated and of limited practical relevance. On the contrary, in-depth elaborated theoretical frameworks should make it easier to capture and understand specific "real-world" phenomena by reducing their complexity based on a fixed set of rules and assumptions (Zerle et al., 2022). Since "nothing is as practical as a good theory" (Lewin, 1945 p. 129) – especially when being applied and validated across three original empirical studies – practitioners from the occupational and the school context (e.g., principals, teachers, leading personnel, coaches) are encouraged to gather a basic understanding of the constructed model and the prepositions of the SOS theory. Applying this knowledge within the scope of their professional roles could benefit appreciators and appreciation receivers in both investigated areas of life.

5.6.3 The Practical Value of the EA-SI Work/ School Scale Outside the Science Context

The previously elaborated practical value of defining and investigating EA-SI in detail are directly associated with a third practical implication. The EA-SI Work Scale (original study one and two) and the EA-SI School Scale (original study three) should not only serve a scientific purpose but also benefit appreciation receivers and appreciators in both investigated contexts.

For example, the instruments could be used as a reference point by (e.g.) direct supervisors, colleagues, or teachers to (1) increase the awareness for the topic, (2) enhance the appreciation receivers' knowledge on experienced appreciation by broadening their horizon on potential expressions of appreciation, and to (3) descriptively evaluate how appreciated the

individual feels regarding specific groups of appreciators. Making it easier to pinpoint exact expressions of experienced appreciation, (4) the instruments could either be used for self-referential reflection or answered with one's employees, colleagues, or students. Above all, the developed instruments could (5) be used to start dialogue between appreciators and appreciation receivers. Applying the theory-based, statistically validated instruments in the occupational or in the school context could serve as a reference point to reflect on and to communicate appreciation-related feelings, individual preferences, and perceived corridors of improvement.

Hence, a direct supervisor using the instrument to reflect on the shared understanding of appreciation with their employees would as well be an example for using the EA-SI Work/School Scale in the previously described way, as would a teacher starting a dialogue with their students based on the described manifestations of appreciation, or a freelancer providing a psycho-educational impulse using the instrument as a reflexive reference point. However, practitioners must keep in mind that the development of structured training programs and the evaluation of their effectiveness are still pending.

6. Conclusion

Across all four independent samples, three original studies, two areas of human lives, and the applied cross-sectional and longitudinal statistical analyses, EA-SI could be reliably and validly measured as a single-dimensional construct. In line with the SOS theory, appreciation receivers who felt more appreciated, reported higher self-esteem and lower stress but also higher satisfaction, motivation, and well-being across both areas of life and both different groups of appreciators. Therefore, this PhD project contributed to countering the described inconsistency in defining and measuring the experience of feeling appreciate, by developing a new, in-detail elaborated, and integrative construct while validating four theoretically anchored instruments to reliably and validly operationalize it. Methodological strengths and limitations were discussed and implications for future research, theory-building, and practical application were deduced. Although much research has to be done to understand the directional effects

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between the investigated variables, researchers and practitioners alike are encouraged to use the insights of this PhD project to facilitate a shared understanding of experienced appreciation and its wide-reaching relevance for humans' everyday lives.

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ERKLÄRUNG

gemäß § 6 Absatz 2 g) und gemäß § 6 Absatz 2 h) der Promotionsordnung
der Fachbereiche 02, 05, 06, 07, 09 und 10 vom 04. April 2016

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Hiermit erkläre ich, dass ich die eingereichte Dissertation selbständig, ohne fremde Hilfe verfasst und mit keinen anderen als den darin angegebenen Hilfsmitteln angefertigt habe, dass die wörtlichen oder dem Inhalt nach aus fremden Arbeiten entnommenen Stellen, Zeichnungen, Skizzen, bildlichen Darstellungen und dergleichen als solche genau kenntlich gemacht sind.

Von der Ordnung zur Sicherung guter wissenschaftlicher Praxis in Forschung und Lehre und zum Verfahren zum Umgang mit wissenschaftlichem Fehlverhalten habe ich Kenntnis genommen.

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Ich habe keine Hilfe von kommerziellen Promotionsberatern in Anspruch genommen.

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