

Epidemiology of resilience and epidemiology of compassion: Common ground?

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Abstract: Compassion has received limited attention in epidemiological research despite its relevance as a social norm and its potential for fostering human flourishing. This conceptual review illustrates how conceptual frameworks and methodological approaches from the epidemiology of resilience can inform the emerging field of epidemiology of compassion. Similar to resilience, compassion is often engendered by environmental stimuli such as suffering and adversity and is shaped by individual traits, cultural norms, and contextual factors. Drawing from resilience literature, we explore whether compassion can be conceptualized as a trait, a state, or a dynamic process, and suggest that it is best understood through social-ecological models that account for multi-level influences.

Methodologically, we emphasize the need for culturally sensitive measures and the incorporation of suffering as a contextual trigger for compassion. By drawing conceptual and methodological parallels with resilience epidemiology, this article raises questions and suggests some useful ways to approach the investigation of compassion as a measurable population-level construct. This framing opens important avenues for research and policy aimed at promoting and sustaining compassion across systems and contexts.

Keywords: compassion, resilience, wellbeing, epidemiology, global health

1. Introduction

Compassion has received limited attention in epidemiological research despite some indication that as a social norm, compassion can enhance human flourishing and collective well-being (1–4). In concept, compassion is an emotional response characterized by benevolence to the suffering of others, accompanied by a sincere desire to alleviate their suffering and promote their well-being (5). It has been suggested that humans thrive in environments characterized by kindness, support, and compassion on a biological and social level (2). Consequently, compassion fosters individual and societal flourishing and general well-being when it circulates widely in a society (2,4,6). Goetz et al. (2010) suggests that compassion is not only an adaptive response to suffering, but also a desirable state that people strive to cultivate in order to live more ethically oriented lives and foster more cooperative communities (3). While compassion is often described as an ethical and prosocial concept, the experience of compassion can also carry emotional burdens. Recent studies have pointed out that compassion can be connected to distress, particularly when one is repeatedly exposed to the suffering of others, highlighting its complexity and paradoxical nature (7). In healthcare and social services, cultivating a compassionate culture is seen as enhancing care experiences and outcomes for all stakeholders, since compassionate care is seen as essential for the humanity of all stakeholders and fosters trust and connection among them

(1,4). It can therefore be said that cultivating and fostering compassion at scale may contribute to a better collective life, as is the case with beliefs found in ethical and spiritual traditions (3,6).

The epidemiology of resilience may provide useful guidance for the study of compassion at the population level. In this paper, we define resilience as “the process of effectively negotiating, adapting to, or managing significant sources of stress or trauma. Assets and resources within the individual, their life and environment facilitate this capacity for adaptation and ‘bouncing back’ in the face of adversity” (p12) (8). Comparatively, resilience has been given considerable attention within the field of epidemiology due to its role in promoting human flourishing and overall well-being (9,10). Studies in this area explore both the distribution of risk and protective factors, resilience-related traits and capacities, and the environmental and structural factors that influence resilient responses, and how individuals, communities, and systems adapt to or recover from adversity (9–12). They are also often conducted within a variety of contexts with the aim of understanding how protective mechanisms can buffer against negative health outcomes (8–12). A major theme in resilience epidemiology is the investigation of how stress, trauma, and adversity influence functioning and outcomes (8,10,12,13). Additionally, there is also the emphasis on adaptation, recovery, and multisystem understandings that may provide insights into how compassion operates under similar circumstances of suffering, adversity, vulnerability, time, place and among people (1,11,14).

Compassion and resilience engage overlapping protective and promotional pathways by linking assets, adaptation to adversity, and health-related outcomes (15). Like other psychosocial constructs, it may therefore be possible and useful to examine the determinants, distribution, and health impacts of compassion using epidemiological tools, such as conceptual framing, study designs, sensitivity of measures, outcome modeling, mediation analysis, and causal inference frameworks (16,17). Additionally, the emerging field of positive psychology emphasizes strengths-based approaches to human functioning, calling for scientific understanding of virtues like compassion, which are crucial for enhancing life satisfaction, social connection, and ethical conduct, as well as buffering against distress (17,18). Complementing this perspective is the Third-Wave Cognitive-Behavioural Therapies (CBT) which also emphasize compassion as both a trainable motivation and a regulatory mechanism (19,20). Compassion-Focused Therapy (CFT), for example, emphasizes cultivating a compassionate attitude toward distress in order to reduce threat-based responses and increase prosocial behavior, offering clear translational pathways for public health interventions that aim to scale compassion across populations (5,19,20). Extending this chain of thought, earlier scholars have suggested that virtues like compassion can be understood as “epidemiology of representations” and individual-level constructs that, when widely shared and distributed across a population, give rise to cultural phenomena amenable to epidemiological analysis (16). Therefore, the purpose of this conceptual review is to illustrate how conceptual frameworks and methodological approaches from the epidemiology of resilience may be used to inform the emerging field of the epidemiology of compassion.

2. Conceptual parallels between resilience and compassion

Resilience enhances an individual's ability to adapt and contributes significantly to their well-being (14,21). Resilience has been shown to negatively correlate with mental health problems such as depression, anxiety, and negative affect, as well as positively correlate with indicators of well-being such as life satisfaction and positive mood (21–23). Moreover, resilience has been characterized as a dynamic process in which an individual successfully negotiates, adapts to, or manages trauma through the strategic use of internal and external resources in order to mitigate

or alter the impact of adversity (8,14,21). As such, resilience contributes to mental health and protects from negative psychological outcomes.

Compassion plays a similar role to resilience in that it facilitates emotional regulation, reduces harm, and promotes flourishing (1,6,24,25). Generally, compassion is understood as comprising three interrelated elements; awareness of suffering, an empathic emotional response, and a motivated action aimed at alleviating or preventing that suffering (1,4,26). This suggests that compassion is useful in promoting adaptive regulation and harm reduction through the orientation of attention towards care-motivated goals when suffering is present (1,15,27,28). At both individual and societal levels, this compassionate orientation can facilitate the de-escalation of threat responses, prosocial problem solving, and the development of norms that support flourishing (2,24,25,29). Some researchers have also suggest that compassion may have a trait component, presenting as an enduring emotional disposition that is characterized by empathy, prosocial motivation, and secure attachment, that predisposes individuals to respond consistently to suffering with care and altruistic concern (3,5,30). Whichever the case, witnessing suffering often induces compassion in others, motivating altruism and prosocial behavior, particularly when the suffering is perceived to be unjust or preventable (3). As individuals respond to suffering with compassion to themselves or others, they enhance the ability to cope with adversity and improve overall well-being (31,32). Self-compassion, for example, is increasingly recognized as a vital inner resource for fostering resilience because it allows individuals to recover from distress, sustain mental health, and grow in the face of adversity (15,33,34). Additionally, within the framework of positive psychology and the emerging field of positive epidemiology, compassion and resilience are seen as measurable, interlinked strengths that contribute to human flourishing (17,18). These constructs reflect basic human capacities shaped by traits and lived experiences, serving as bridges between adversity and well-being within both psychological science and public health domains (1,21,35).

3. Consideration for framing compassion through resilience theory

Resilience theory may provide a useful conceptual framework for exploring compassion as a measurable construct in epidemiology. It has been apparent from the foregoing that resilience and compassion share a common point of convergence in terms of the conditions under which they are activated. In both constructs, there is the question of whether suffering and adversity are necessary for them to be expressed (3,8,14). In resilience research, this question has influenced the distinction between resilience as a trait and resilience as a dynamic process or state (8,12,36). In the 1980s, Block and Block introduced the concept of ego-resilience, a stable personality trait that indicates a person's ability to adapt in a dynamic environment (36). In recent research, resilience has been emphasized as a dynamic and situational process that is influenced by context-specific factors and experience (8,12,37). When looking at compassion from the perspective of epidemiology, we might ask similar questions. It is possible to measure compassion in a meaningful manner outside of the context of suffering? Do you consider compassion a stable trait, a situational state, or a mutually reinforcing dynamic between both? According to Mascaro et al. (2020), contemplative practices and methods intended to foster compassion usually assume that inducing compassionate states can enhance corresponding traits (5). This relationship between traits and states is comparable to those in the resilience literature, suggesting that measurement approaches can benefit from the theoretical parallels.

In parallel with these trait-state considerations, resilience research is increasingly attending to the ecological validity of their studies in addition to individual-level constructs, acknowledging that resilience may not manifest in the same way in different contexts, as

adaptation is influenced by interactions between individuals, relationships, communities, and systems (8,11,14,38). In a similar fashion, it is also possible for compassion to be influenced by multisystem factors, including individual, cultural norms, institutional structures, religious or moral beliefs, and the quality of social support networks (1,3,4,39). In collective cultures for instance, compassion may be expressed most strongly through communal duty and relational harmony, while in individualistic settings, compassion may be viewed as a personal moral virtue (4). These cultural influences not only affect the expression of compassion, but also how it can be perceived and measured. This perspective aligns with the concept of embodiment, a central element of eco-social theory, as well as with the expanded risk-factor model in epidemiological inquiry (40,41). Embodiment recognizes that human beings are both biological and social, and their bodies reflect their contextual experiences. As such, health and behavior cannot be fully understood without considering the social and material environments in which people live (40). Similarly, the expanded risk-factor model encourages epidemiologists to account for the layered and multifaceted nature of exposures, which include physical, psychological, social, and existential domains, and are embedded in and expressed through the body over time (41).

Together, conceptual guidance from resilience research may help develop an epidemiology of compassion. Among other things, there is a debate with respect to whether resilience and compassion are best characterized in terms of their core constructs as stable traits, dynamic processes, or interactive systems (5,21,36,42). Both emphasize the importance of context, and both increasingly recognize how social and cultural systems influence individual responses to adversity (3,11,39,43). Per this view, compassion - like resilience - can be framed both as an individual orientation, contextual or moral quality. It may also be viewed as an asset for public health that can be measured in person, place, and time, and can be situated in broader systems of vulnerability and support.

4. Some methodological considerations for the study of epidemiology of compassion from resilience research

The study of the epidemiology of compassion, much like resilience, requires rigorous methodological approaches due to the subjective and context-dependent nature of both constructs. This type of rigor is essential to advance understanding and inform the development of effective, evidence-based interventions. In this regard, the emerging field of epidemiology of compassion can benefit from the methodological lessons learned in resilience science, as well as some methodological challenges to anticipate when measuring compassion.

5. Establishing clear and consistent definitions

Resilience research has struggled with conceptual heterogeneity, making it challenging to have a unified operational definition. Varying criteria for adversity, adjustment, or bouncing back, has led to inconsistent conclusions (8,44). In line with this, approaches in operationalizing resilience have varied widely between studies, with inconsistencies in defining both adversity and positive adjustment. These inconsistencies can lead to varying conclusions and different estimates of resilience rates among similar risk groups (8,44). Taking this experience into account, just as resilience epidemiology requires clear explanations of concepts such as adversity, competence, and recovery, compassion epidemiology requires clear and quantifiable case definitions that take into account the core components such as awareness of suffering, benevolent emotional responses, and motivation to help or act (1,5). Furthermore, it is important to distinguish compassion from related concepts such as empathy, because, according to some researchers, empathy can result in an inward focus or aversive response, whereas compassion is usually

characterized by an outward focus and an active caregiving response (45,46). Thus, empathy involves mirroring another's emotions, which, if unregulated, can result in empathic distress and emotional exhaustion (24,47). Compassion on the other hand, which integrates awareness of suffering with emotional balance and prosocial motivation, potentially fosters behaviors that alleviate distress and promote well-being (1,48). These distinctions have important implications for epidemiological inquiry, as they clarify that compassion is a constructive, externally directed process linked to resilience and sustained caregiving, whereas empathy, in its affective form, is likely to contribute to emotional distress and burnout if unregulated (47,49). Therefore, in order to advance the epidemiological study of compassion, conceptual clarity and consistency are essential. This begins with a clear definition of compassion, which impacts measurement, analysis, and interpretation, and enhances the ability to synthesize results and quantify compassion consistently across contexts.

6. Methodologically sound measurement strategies

The measurement limitations of existing resilience scales are well documented, including concerns related to psychometric validity, cultural bias, and conceptual ambiguity (21,44,50). In addition to these critiques, additional concerns have been raised regarding the absence of a universally accepted 'gold standard' measure (50), difficulties operationalizing adversity and/or risk (8,44), the inherent limitations of self-report instruments (21,50), temporal dimensions as well as concerns regarding their cultural appropriateness and generalizability (50,51). The combination of these challenges undermine the consistency of resilience measurement making it difficult to evaluate and compare research findings across studies (21,50).

The above measurement limitations in resilience research offer good lessons for epidemiological research on compassion. First, it is important to develop scales and measures of compassion that are robust and psychometrically sound. In recent years, several validated instruments quantifying compassion, including the Compassion Scale (CS) (32), Sussex-Oxford Compassion Scale (SOCS) (52) and Santa Clara Brief Compassion Scale (SCBCS) (53), have demonstrated good internal consistency and evidence of construct validity. Nevertheless, questions remain about whether these instruments adequately capture compassion, despite emerging cross-cultural research supporting measurement invariance in diverse settings (54–56). As Strauss et al. (2016) point out, there is considerable uncertainty about whether current tools capture the construct of compassion accurately, which presents a major challenge for advancing research (30). The epidemiology of compassion should take into account these concerns; assessing the impact of compassion, as well as the impact of interventions designed to promote it, is not possible without accurate measurement. The establishment of this measurement clarity is even more significant in light of the conceptual overlap between compassion and related constructs such as altruism, empathy, and prosocial behaviour (5). These terms are often used interchangeably, yet their definitions and operationalization vary significantly across studies and contexts, further complicating measurement and interpretability (5). Such challenges echo longstanding principles in epidemiological science, where accurate and reliable measurement is foundational to valid inference (41,57). As emphasized in epidemiological literature, misclassification and measurement error, often stemming from subjective self-report instruments, poorly defined constructs, and lack of tool validity, especially, contextual validity can generate false knowledge and lead to misleading conclusions (41,57,58). Developing and validating robust compassion measures thus requires the same methodological rigor applied to other complex human experiences and behaviors.

Secondly, uncertainties in how adversity or risk is measured in resilience research have made it difficult to determine whether individuals labeled as resilient have experienced comparable levels of adversity/suffering, particularly given that adversity/suffering can vary significantly in intensity or be perceived differently (8,44). A similar challenge exists in the context of compassion research, where compassion is rarely expressed in isolation. It is typically elicited by the recognition of suffering in others, and this suffering differs in nature, intensity, and visibility (1,2,5,28,30). We believe that measuring suffering alongside compassionate responses allows researchers to examine whether certain types or patterns of exposure foster or diminish compassion over time. Also, as with resilience, suffering or adversity may manifest differently in compassion, not only across individuals but also across social, cultural, and institutional contexts, underscoring the need for contextually sensitive tools to assess both constructs (2,39). Therefore, the development of robust measures of suffering or adversity, as both triggers for and targets of compassionate interventions, is critical to advancing the epidemiology of compassion, as generally suggested for empirical studies (59). To achieve this, these measures should extend beyond clinical symptoms and include multi-item, context-sensitive instruments that capture the generalized experience of suffering, its intensity, chronicity, and visibility across populations (59). This way, such measures will facilitate the empirical investigation of compassion by mapping the variation of suffering across individuals, contexts and demographics (19,59,60). Ultimately, these tools would enable researchers to evaluate whether compassion leads to measurable reductions in suffering at the population level, thereby shifting compassion from a moral aspiration to an evidence-based strategy for improving population health and well-being (4,5,25).

Finally, time frame specificity is an important aspect of resilience research given its usual definition as a dynamic process (8,50,61). Although most instruments have not specifically defined temporal anchors (e.g., daily, past week, past month), most have allowed this flexibility and modifications have been made in different settings to accommodate temporality (62–64). Traditional resilience research, especially concerning daily stressors, often uses static questionnaires designed for trait resilience which are often unable to capture its dynamic nature. While some studies use time frames, such as "today" or "in this moment," these changes may reflect subjective perceptions rather than the actual moment-to-moment recovery process from stress (61). Compassion like resilience is understood as an interpersonal process that unfolds over time, encompassing subprocesses such as recognizing suffering, feeling concern, taking action to alleviate it, and engaging in meaning making, it becomes evident that compassion is inherently dynamic (5,30,39). These components influence one another in an ongoing, reciprocal manner, continually shaped by actions and their consequences. Thus, just like resilience research and as suggested elsewhere, measures need to account for how compassion "unfolds over time", the absence of which may result in inconsistencies that limits comprehensive understanding (39). Such measures should also account for intensity, chronicity and visibility of exposures (e.g., suffering) (1,3). In this way, it becomes possible to model dose-response as well as context-mechanism-outcome patterns. That is, whether certain exposure profiles facilitate compassionate action over time or inhibit it as seen in epidemiological studies (58). For instance, Sinclair et al (2016)'s empirical model of compassion in care offers domain-specific constructs that can be adapted for population research (60).

7. Conclusion

The purpose of this conceptual review is to demonstrate the theoretical and methodological similarities between the epidemiology of resilience and the emerging field of the epidemiology

of compassion, in order to enable the assessment of compassion as a measurable and useful construct for public health. Similar to resilience, compassion plays a key role in fostering social connection, emotional regulation, and prosocial behaviors, making it a valuable but underutilized construct in epidemiological research. The use of resilience frameworks can help build conceptual clarity, account for contextual variations, and improve measurement, modeling, and application of compassion across populations and contexts.

Despite this, caution is warranted when using epidemiological approaches for compassion. In much the same way resilience research has struggled with the lack of gold-standard instruments and contextual generalizability (21,25,44,50), compassion measurement tools have to overcome similar limitations (5,30). Furthermore, studies of prosocial behavior also remind us that external cues, such as observability, social norms, and reputational concerns, can influence such actions as compassion (65). Thus, this raises an important epistemological question: when measuring compassion, are we measuring an enduring internal motivation or a situationally induced behavior? It is important that this distinction be made in order to maintain the integrity and reproducibility of compassion research.

Drawing from Sperber's (1985) concept of an "epidemiology of representations," the dissemination and adoption of compassion across populations can be understood as a culturally embedded process (16). Compassion, like other representations, is shaped by the interaction between mental or cognitive appraisals and public perception, where mental representations can lead to public representations, which in turn can cause others to form new mental representations (16). Its transmission is neither linear nor stable, and its expression is contextually filtered by belief systems, institutional structures, and sociocultural norms (1,3,4,16,39,65). Thus, developing a robust epidemiology of compassion requires not only psychometric refinement, but also the integration of cultural psychology, anthropology, and system-level analysis.

In summary, the epidemiology of compassion presents both a promising and a complex challenge. The conceptual and methodological tools of resilience research provide a strong foundation for compassion research, but the moral salience of compassion and its context-dependent nature require methodological rigor and interdisciplinary consideration. Developing validated, culturally sensitive instruments, utilizing multilevel and mixed-method approaches, and critically interrogating the socio-ecological and institutional conditions that promote or hinder compassion are essential steps in future research. In this way, compassion can be rigorously articulated as both an object of epidemiological inquiry and a mechanism for promoting collective well-being.

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References

1. Addiss DG, Richards A, Adiabu S, Horwath E, Leruth S, Graham AL, et al. Epidemiology of compassion: A literature review. *Front Psychol.* 2022;13:992705. <https://doi.org/10.3389/fpsyg.2022.992705>
2. Gilbert P. *The compassionate mind: A New approach to Life's Challenges*. London: Constable; 2009[Cited 2024 Jul 29]. Available from: ISBN:9781845297138
3. Goetz JL, Keltner D, Simon-Thomas E. Compassion: an evolutionary analysis and empirical review. *Psychol Bull.* 2010;136(3):351–374. <https://doi.org/10.1037/a0018807>
4. Vusio F, Odentz K, Plunkett C. Experience of compassionate care in mental health and community-based services for children and young people: facilitators of, and barriers to compassionate care– a systematic review. *Eur Child Adolesc Psychiatry [Internet]*. 2025 Apr 4 [cited 2025 May 20]. <https://doi.org/10.1007/s00787-025-02711-y>
5. Mascaro JS, Florian MP, Ash MJ, Palmer PK, Frazier T, Condon P, et al. Ways of knowing compassion: How do we come to know, understand, and measure compassion when we see it? *Front Psychol.* 2020;11:547241. <https://doi.org/10.3389/fpsyg.2020.547241>
6. Seppala E, Rossomando T, Doty JR. Social connection and compassion: Important predictors of health and well-being. *Soc Res Int Q.* 2013;80(2):411–30. <https://doi.org/10.1353/sor.2013.0027>
7. Condon P, Feldman Barrett L. Conceptualizing and experiencing compassion. *Emotion.* 2013;13(5):817–821. <https://doi.org/10.1037/a0033747>
8. Windle G. What is resilience? A review and concept analysis. *Rev Clin Gerontol.* 2011;21(2):152–69. <https://doi.org/10.1017/S0959259810000420>

9. Fisher RN, Sepehry AA, Maglio AST. Prevalence of resilience, risk, and protective factors in children and youth in foster care: A systematic and meta-analytic review. *J Individ Psychol*. 2023;79(3):240–74. <https://doi.org/10.1353/jip.2023.a909958>
10. Janitra FE, Jen HJ, Chu H, Chen R, Pien LC, Liu D, et al. Global prevalence of low resilience among the general population and health professionals during the COVID-19 pandemic: A meta-analysis. *J Affect Disord*. 2023;332:29–46. <https://doi.org/10.1016/j.jad.2023.03.077>
11. Ungar M. The social ecology of resilience: addressing contextual and cultural ambiguity of a nascent construct. *Am J Orthopsychiatry*. 2011;81(1):1-17. <https://doi.org/10.1111/j.1939-0025.2010.01067.x>
12. Masten AS. Ordinary magic: Resilience processes in development. *Am Psychol*. 2001;56(3):227. <https://doi.org/10.1037/0003-066X.56.3.227-238>
13. Ungar M. Resilience, trauma, context, and culture. *Trauma Violence Abuse*. 2013;14(3):255–66. <https://doi.org/10.1177/1524838013487805>
14. Masten AS, Lucke CM, Nelson KM, Stallworthy IC. Resilience in development and psychopathology: multisystem perspectives. *Annu Rev Clin Psychol*. 2021;17(1):521–49. <https://doi.org/10.1146/annurev-clinpsy-081219-120307>
15. Austin J, Drossaert CHC, Bohlmeijer ET. Self-Compassion as a Resource of Resilience. In: Finlay-Jones A, Bluth K, Neff K, editors. *Handbook of Self-Compassion* [Internet]. Cham: Springer International Publishing; 2023 [cited 2025 Aug 8]. p. 165–82. (Mindfulness in Behavioral Health). https://doi.org/10.1007/978-3-031-22348-8_10
16. Sperber D. Anthropology and psychology: Towards an epidemiology of representations. *Man*. 1985;73–89. <https://doi.org/10.2307/2802222>
17. VanderWeele TJ, Chen Y, Long K, Kim ES, Trudel-Fitzgerald C, Kubzansky LD. Positive epidemiology? *Epidemiology*. 2020;31(2):189–93. <https://doi.org/10.1097/EDE.0000000000001147>
18. Gable SL, Haidt J. What (and Why) is Positive Psychology? *Rev Gen Psychol*. 2005 Jun;9(2):103–10. <https://doi.org/10.1037/1089-2680.9.2.103>
19. Gilbert P. *Compassion focused therapy: Distinctive features* [Internet]. Routledge; 2010 [cited 2025 Oct 25]. <https://doi.org/10.1037/1089-2680.9.2.103>
20. Hayes SC, Strosahl KD, Wilson KG. *Acceptance and commitment therapy: The process and practice of mindful change* [Internet]. Guilford press; 2011 [cited 2025 Oct 25].
21. Hu T, Zhang D, Wang J. A meta-analysis of the trait resilience and mental health. *Personal Individ Differ*. 2015;76:18–27. <https://doi.org/10.1016/j.paid.2014.11.039>
22. Wu Y, Sang Z qin, Zhang XC, Margraf J. The relationship between resilience and mental health in Chinese college students: a longitudinal cross-lagged analysis. *Front Psychol*. 2020;11:108. <https://doi.org/10.3389/fpsyg.2020.00108>
23. Padmanabhanunni A, Pretorius TB, Khamisa N. The role of resilience in the relationship between role stress and psychological well-being during the COVID-19 pandemic: a cross-sectional study. *BMC Psychol*. 2023 Feb 14;11(1):45. <https://doi.org/10.1186/s40359-023-01082-w>
24. Sengupta P, Saxena P. The art of compassion in mental healthcare for all: Back to the basics. *Indian J Psychol Med*. 2024 Jan;46(1):72–7. <https://doi.org/10.1177/02537176231158126>
25. Ford M, Rothmann S, Van Zyl LE. Compassion, secure flourishing, and organizational commitment of managers. *Front Organ Psychol*. 2024;2:1383378. <https://doi.org/10.3389/forgp.2024.1383378>
26. Focus Area for Compassion and Ethics. *Global Health compassion rounds* [Internet]. Task Force for Global Health; 2022 [cited 2025 Oct 25]. Available from: <https://www.taskforce.org/face-global-health-compassion-rounds/>
27. Steindl SR, Tellegen CL, Filus A, Seppälä E, Doty JR, Kirby JN. The Compassion Motivation and Action Scales: a self-report measure of compassionate and self-compassionate behaviours. *Aust Psychol*. 2021 Mar 4;56(2):93–110. <https://doi.org/10.1080/00050067.2021.1893110>
28. Oveis C, Horberg EJ, Keltner D. Compassion, pride, and social intuitions of self-other similarity. *J Pers Soc Psychol*. 2010;98(4):618–630. <https://doi.org/10.1037/a0017628>

29. Halifax J. The precious necessity of compassion. *J Pain Symptom Manage.* 2011;41(1):146–53. <https://doi.org/10.1016/j.jpainsymman.2010.08.010>
30. Strauss C, Taylor BL, Gu J, Kuyken W, Baer R, Jones F, et al. What is compassion and how can we measure it? A review of definitions and measures. *Clin Psychol Rev.* 2016;47:15–27. <https://doi.org/10.1016/j.cpr.2016.05.004>
31. Neff KD, Germer CK. A pilot study and randomized controlled trial of the mindful self-compassion program. *J Clin Psychol.* 2013 Jan;69(1):28–44. <https://doi.org/10.1002/jclp.21923>
32. Pommier E, Neff KD, Tóth-Király I. The development and validation of the compassion scale. *Assessment.* 2020 Jan;27(1):21–39. <https://doi.org/10.1177/1073191119874108>
33. Bluth K, Mullarkey M, Lathren C. Self-Compassion: A potential path to adolescent resilience and positive exploration. *J Child Fam Stud.* 2018 Sep;27(9):3037–47. <https://doi.org/10.1007/s10826-018-1125-1>
34. Neff KD, McGehee P. Self-compassion and psychological resilience among adolescents and young adults. *Self Identity.* 2010 Jul;9(3):225–40. <https://doi.org/10.1080/15298860902979307>
35. Adiguzel V, Tan K, Okanlı A. The effect of compassion on psychological resilience: a study of healthcare professionals. *Curr Psychol.* 2024 Mar;43(12):10989–97. <https://doi.org/10.1007/s12144-023-05169-w>
36. Block JH, Block J. The role of ego-control and ego-resiliency in the organization of behavior. In: *Development of cognition, affect, and social relations* [Internet]. Psychology Press; 2014 [cited 2024 Jul 24]. p. 39–101. <https://doi.org/10.4324/9781315803029-7>
37. Ungar M. A constructionist discourse on resilience: Multiple contexts, multiple realities among at-risk children and youth. *Youth Soc.* 2004;35(3):341–65. <https://doi.org/10.1177/0044118X03257030>
38. Sakeah JK, Addiss D, Feng C, Asaana P, Sakeah E, Gyapong M, et al. What does resilience and well-being mean to community health workers? An exploratory study in the Upper East Region, Ghana. Manuscript submitted.
39. Dutton JE, Workman KM, Hardin AE. Compassion at work. *Annu Rev Organ Psychol Organ Behav.* 2014 Mar 21;1(1):277–304. <https://doi.org/10.1146/annurev-orgpsych-031413-091221>
40. Krieger N. Embodiment: a conceptual glossary for epidemiology. *J Epidemiol Community Health.* 2005;59(5):350–5. <https://doi.org/10.1136/jech.2004.024562>
41. David, D C, Moyes S. *Gordis Epidemiology.* 6th ed. Philadelphia (PA): Elsevier, Inc.; 2019. ISBN :9780323552318
42. Oviedo DC, Tratner AE, Pinzón MS, Rodríguez-Araña S, Pauli-Quirós E, Chavarría C, et al. Resilience mediates the effect of the COVID-19 pandemic on mental health in a sample of adults in Panama. *Front Psychol.* 2023;14:1235935. <https://doi.org/10.3389/fpsyg.2023.1235935>
43. Chang JH, Detrick SM, Maas Z, Çoşkun H, Klos C, Zeifert H, et al. Cross-cultural comparison of compassion: An in-depth analysis of cultural differences in compassion using the Compassion of Others' Lives (COOL) Scale. *Humanist Psychol.* 2021;49(3):459–478. <https://doi.org/10.1037/hum0000167>
44. Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Dev.* 2000;71(3):543–62. <https://doi.org/10.1111/1467-8624.00164>
45. Ahmed Z, Ellahham S, Soomro M, Shams S, Latif K. Exploring the impact of compassion and leadership on patient safety and quality in healthcare systems: a narrative review. *BMJ Open Qual.* 2024;13(Suppl 2):e002651. <https://doi.org/10.1136/bmjopen-2023-002651>
46. Stevens F, Taber K. The neuroscience of empathy and compassion in pro-social behavior. *Neuropsychologia.* 2021;159:107925. <https://doi.org/10.1016/j.neuropsychologia.2021.107925>
47. Klimecki OM, Leiberg S, Ricard M, Singer T. Differential pattern of functional brain plasticity after compassion and empathy training. *Soc Cogn Affect Neurosci.* 2014;9(6):873–9. <https://doi.org/10.1093/scan/nst060>
48. Singer T, Klimecki OM. Empathy and compassion. *Curr Biol.* 2014;24(18):R875–8. <https://doi.org/10.1016/j.cub.2014.06.054>

49. Hofmeyer A, Kennedy K, Taylor R. Contesting the term ‘compassion fatigue’: Integrating findings from social neuroscience and self-care research. *Collegian*. 2020;27(2):232–7. <https://doi.org/10.1016/j.colegn.2019.07.001>
50. Windle G, Bennett KM, Noyes J. A methodological review of resilience measurement scales. *Health Qual Life Outcomes*. 2011;9(1):8. <https://doi.org/10.1186/1477-7525-9-8>
51. Panter-Brick C. Health, risk, and resilience: Interdisciplinary concepts and applications. *Annu Rev Anthropol*. 2014 Oct 21;43(1):431–48. <https://doi.org/10.1146/annurev-anthro-102313-025944>
52. Gu J, Baer R, Cavanagh K, Kuyken W, Strauss C. Development and psychometric properties of the Sussex-Oxford Compassion Scales (SOCS). *Assessment*. 2020 Jan;27(1):3–20. <https://doi.org/10.1177/1073191119860911>
53. Hwang JY, Plante T, Lackey K. The Development of the Santa Clara Brief Compassion Scale: An Abbreviation of Sprecher and Fehr’s Compassionate Love Scale. *Pastor Psychol*. 2008 Mar;56(4):421–8. <https://doi.org/10.1007/s11089-008-0117-2>
54. Kim J, Seo JW. Assessing compassion in Korean population: Psychometric properties of the Korean version of Sussex-Oxford Compassion Scales. *Front Psychol*. 2021;12:744481. <https://doi.org/10.3389/fpsyg.2021.744481>
55. Sousa R, Castilho P, Vieira C, Vagos P, Rijo D. Dimensionality and gender-based measurement invariance of the Compassion Scale in a community sample. *Personal Individ Differ*. 2017;117:182–7. <https://doi.org/10.1016/j.paid.2017.06.003>
56. Adu P, Popoola T, Iqbal N, Roemer A, Collings S, Aspin C, et al. Cross-Cultural Adaptation and Application of the One-Parameter Item Response Model to the Santa Clara Brief Compassion Scale (SCBCS). *Mindfulness* [Internet]. 2025 Sep 22 [cited 2025 Oct 25]. <https://doi.org/10.1007/s12671-025-02666-w>
57. Bhopal RS. *Concepts of epidemiology: integrating the ideas, theories, principles, and methods of epidemiology*. 3rd ed. Oxford: Oxford University Press; 2016 [cited 2025 Jul 14]. ISBN: 9780199543144
58. Moyses S, F. Javier N. *Epidemiology beyond the basics*. 4th ed. Burlington (MA): Jones & Bartlett Publishers; 2014. ISBN:9781284116595
59. VanderWeele TJ. Suffering and response: Directions in empirical research. *Soc Sci Med*. 2019;224:58–66. <https://doi.org/10.1016/j.socscimed.2019.01.041>
60. Sinclair S, McClement S, Raffin-Bouchal S, Hack TF, Hagen NA, McConnell S, et al. Compassion in health care: an empirical model. *J Pain Symptom Manage*. 2016;51(2):193–203. <https://doi.org/10.1016/j.jpainsymman.2015.10.009>
61. Zietse J, Keijsers L, Hillegers MH, Vreeker A, van Harmelen AL, de Vries LP. Daily resilience: A systematic review of measures and associations with well-being and mental health in experience sampling studies. *Dev Psychopathol*. 2025;1–26. <https://doi.org/10.31234/osf.io/9yudb>
62. Ungar M, Liebenberg L. Assessing resilience across cultures using mixed methods: Construction of the child and youth resilience measure. *J Mix Methods Res*. 2011;5(2):126–49. <https://doi.org/10.1177/1558689811400607>
63. Connor KM, Davidson JR. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depress Anxiety*. 2003;18(2):76–82. <https://doi.org/10.1002/da.10113>
64. Resilience Research Centre. CYRM and ARM user manual v2.5. Halifax, NS: [Internet]. Resilience Research Centre, Dalhousie University; 2022. Available from: <http://www.resilienceresearch.org/>
65. White K, Habib R, Dahl DW. A Review and Framework for Thinking about the Drivers of Prosocial Consumer Behavior. *J Assoc Consum Res*. 2020 Jan;5(1):2–18. <https://doi.org/10.1086/706782>