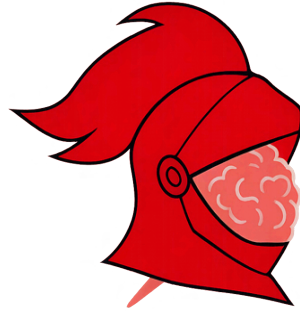


uKnights Minds

The Rutgers Undergraduate
Psychology Journal



Spring 2026



uKnighthed Minds

Rutgers Undergraduate Psychology Journal

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I. About Us

uKnights Minds is a brand new academic journal showcasing undergraduate research in all fields of psychology. As the first and only undergraduate psychology journal at Rutgers, *uKnights Minds* encourages innovation by providing undergraduates with an open-source, peer-reviewed platform to share their research.

Our Mission

The mission of *uKnights Minds* is to encourage undergraduate research through dedicated training of journal editors and thorough engagement with student authors. We strive to empower students to explore their interests and break into the research field through collaboration and constructive feedback. Undergraduate authors are offered the rare opportunity to publish and receive editorial evaluation, thereby ensuring the publication of ethical, evidence-based research. As the sole undergraduate psychology research journal at Rutgers, *uKnights Minds* seeks to build an extensive collection of publications that meaningfully contribute to the Rutgers Psychology Department and the scientific field as a whole.

Diversity, Equity, and Inclusion Statement

uKnights Minds, in both its creation and continuation, values diversity, equity, and inclusion. We recognize the prioritization of “WEIRD” or Western, Educated, Industrialized, Rich, and Democratic populations in both past and present psychological research, and strive to narrow the resulting gaps in the field through our inclusion and contributions to the broader community of psychological science. To achieve this, we aim to support and publish undergraduate work that investigates a wide range of populations, perspectives, and contexts. We believe that by doing so, we can strengthen the accuracy, relevance, and impact of psychological science as a whole, while representing Rutgers University as a leader in inclusive psychological research.

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III. Letter From the Editors

Dear Reader,

Welcome to the inaugural issue of *uKnights Minds*, an undergraduate research journal dedicated to psychological research at Rutgers University. As we present our first edition, we are proud to reaffirm our mission: to create an inclusive, supportive, and academically rigorous space where undergraduate researchers can showcase their work, gain recognition, and contribute to the growing body of psychological scholarship. At its core, *uKnights Minds* is committed to making research accessible and welcoming to all students, regardless of prior publishing experience, while bridging the gap between classroom learning and active participation in the publication of peer-reviewed research. Through constructive feedback and guidance, we aim to support student growth, foster a collaborative environment, and increase the visibility of undergraduate research at Rutgers.

This year's publications reflect a diverse and innovative range of psychological inquiry, highlighting the intellectual curiosity and dedication of Rutgers undergraduate researchers. The works featured in this inaugural issue span a variety of topics, including Alzheimer's disease and sleep, caregiving and gender roles in East Asian contexts, and the effects of labeling on self-concept and personality. They also represent a range of research approaches including empirical studies and literature reviews. Together, these works reflect both the vast range of subjects in psychological research and the meaningful, real-world impact of undergraduate scholarship.

We deeply appreciate all of the undergraduate researchers, their faculty advisors, and graduate student mentors who submitted their work to this journal. Their contributions have laid the foundation for what we hope will become a lasting and impactful publication, and we are honored that they are part of this beginning. We also extend our sincere gratitude to our graduate student mentor, Brianna Lopez, whose time and guidance were pivotal in bringing this journal to completion. Additionally, we thank Dr. Diana Sanchez for her continued support in helping to make *uKnights Minds* a reality.

As we look toward the future, we are excited to continue growing this journal as a living record of Rutgers psychology's intellectual evolution. We encourage future contributors to submit their work with confidence. We also invite students to contribute to our publication by applying to become members of our editorial team. Our journal thrives on new perspectives, and every voice adds value to this community. We hope this publication inspires students to pursue their academic interests, develop their research skills, and share their ideas with others.

Together, we aim to build a space where undergraduate scholarship is recognized, sustained, and celebrated.

Sincerely,

The *uKnights Minds* Team



The Effects of Mislabeled: A False Feedback Personality Study

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Abstract

Labels play a powerful role in shaping self-concept, behavior, and social evaluation, yet little research has examined whether false personality labels from credible sources can produce lasting changes in self-perception. Drawing on a modified labeling theory proposition, stigma research, and stereotype threat frameworks, the present study examined whether false personality feedback, when paired with sustained self-monitoring, could alter self-reported personality traits. One hundred and twenty undergraduate students completed the Big Five Inventory-2 (BFI-2) extraversion scale at baseline and follow-up. Participants in the experimental condition received fabricated feedback indicating a slight lean toward introversion or extraversion and completed daily trait-focused self-monitoring for three weeks, while a control/baseline group received no feedback or monitoring. Paired-samples *t*-tests revealed a significant decrease in extraversion among participants who received false introversion feedback, whereas those who received false extraversion feedback and control participants showed no significant change. These findings suggest that externally assigned labels can initiate recursive changes in self-concept when they reorient attention and memory toward label-consistent experiences. Results support theoretical models proposing that labels influence identity through top-down cognitive processes. Implications are discussed for diagnostic communication, assessment practices, and the potential risks of mislabeling in clinical and educational contexts.

Keywords: Labeling effects; self-concept; false feedback; labeling theory; stereotype threat; stigma; personality assessment; BFI-2; Barnum effect; self-monitoring; extraversion; introversion

Author Contributions: Daniel Rozenberg served as lead for conceptualization, writing original draft, and writing—review and editing. Dr. David Wilder contributed to supervision. Shannon Hart contributed to providing resources. William Coleman contributed to providing software assistance.

Introduction

Labels play a central role in shaping individual identity, behavior, and interactions with society. Whether assigned by professionals, trusted individuals, or through self-identification, labels such as mental health diagnoses or personality test results can carry significant weight in influencing self-concept and behavior. In this paper, labeling refers to the act of designating an individual or group using a simplified term that may convey status, stigma, or other characteristics (Becker, 1963). However, labels vary widely in form and function. While much of the existing literature focuses on diagnostic or socially stigmatized labels, the present study specifically examines personality trait labels, particularly introversion and extraversion, as a more subtle but potentially influential form of categorization. Now, even though labels can provide clarity and pathways for intervention, they may also reinforce stigma, shape expectations, and potentially alter behaviors in ways that align with the label, irrespective of its accuracy (Kroska et al., 2015). This dual nature of labeling warrants a closer examination of how individuals internalize and respond to these designations.

As an example of the effects of labels, consider the consequences of diagnosing a person with a mental illness. The social stigma associated with such diagnoses has historically been negative. For instance, Angermeyer and Dietrich (2006) reviewed 33 national surveys and 29 local/regional surveys across 15 countries that assessed public stigma about mental illness in publications from 1990 to 2004. They reported that the general public has a tendency to socially distance themselves from individuals with mental illness, a tendency that intensifies as the relationship becomes more personal or intimate.

Additionally, when subjects were able to assign a mental illness label to a fabricated description of someone, they were more likely to show signs of rejection towards that individual. This evidence supports how labeling can lead to adverse reactions and negative ideation towards those who carry that label. Such findings demonstrate that diagnostic labels carry powerful social meanings that extend well beyond clinical utility—they influence how individuals are viewed, treated, and possibly how they view themselves.

To expand on this line of thought, the historically negative perception of certain diagnostic labels can be extended to the concept of self-labeling—that is, how stigma operates when individuals apply a “negative” label to themselves. Fox & Earnshaw (2023) explored the relationship between mental illness stigma and self-labeling. They reported that individuals who do not self-label as mentally ill endorsed higher levels of stereotypes, prejudice, and experienced stigma compared to those who did self-label. Paradoxically, self-labelers reported elevated internalized stigma, such as accepting harmful stereotypes or prejudice about oneself, suggesting that adopting a label may increase vulnerability to internal criticism and shape how individuals come to understand and evaluate themselves, even as it is associated with reduced external prejudice (Fox & Earnshaw, 2023). These findings suggest that labels can impose societal expectations that foster internal stigma along with an increased vulnerability to competence-based criticism (Kroska et al., 2015, p. 68). It is that increased vulnerability to criticism, paired with those strong societal expectations, that may give labels so much power. A study by Warner et al. (1989) also

examined the effects of accepting a mental illness label among psychotic patients. While acceptance was correlated with improved functioning and a higher internal locus of control, it was similarly associated with increased perceived stigma and lower self-esteem, which is consistent with the results found by Fox & Earnshaw (2023). Together, these findings illustrate that labeling can produce meaningful changes in self-concept while providing a framework for interpreting experiences. In this way, labels may introduce new standards that influence how individuals think about their own abilities, traits, and identity. This suggests that labels can simultaneously organize self-understanding and alter it.

While these findings highlight how labels can shape self-concept, an important question remains: under what conditions are individuals most likely to accept and internalize such labels? The extent to which labels influence self-concept may depend on the perceived credibility of the source assigning them. Labels delivered by a trusted or authoritative source, such as a validated personality assessment, are more likely to be interpreted as accurate and meaningful (Ilgen et al., 1979). When individuals believe that feedback reflects an objective evaluation, they may be more inclined to attend to and internalize label-consistent information. In this way, credibility may amplify the impact of labeling by increasing the likelihood that individuals adopt the label as a valid representation of themselves.

The effects of social categorization or labeling have also been studied by social psychologists outside the clinical domain. One area of social psychological research that has focused on the consequences of labeling is stereotype threat

(Steele & Aronson, 1995). Research on stereotype threat provides examples that underscore how labels can affect one's performance and self-evaluation. Jones (2011) demonstrated that women's performance on a math test declined after they viewed a video reinforcing a notion that men are better at taking said math test than women. Salience of the math stereotype appeared to lead to a self-fulfilling prophecy for the female subjects (Jones, 2011). However, if women instead viewed a video indicating that males and females perform equally well on said math test, there were no gender differences in the resulting scores. This type of performance change caused by stereotype threat has been shown to be reliable across many domains, to the point that current research on this topic focuses on why it happens rather than "when" or "whether" (Mendes & Jamieson, 2011, p. 53). These findings illustrate that externally activated labels can shape behavior in ways that align with those labels. Importantly, this suggests that individuals may begin to interpret their own abilities and actions through the lens of the imposed category, providing a potential pathway through which labels influence self-concept.

However, threat-reduction strategies, such as self-affirmation and misattribution, can mitigate the effect of stereotype threat on performance (Ben-Zeev et al., 2005; Jones, 2011). Self-affirmation occurs when one reflects on core values/strengths to reinforce self-worth (Steele, 1988). In the Jones (2011) study, women were told that the average college GPA and SAT scores were 3.0 and 1,000 respectively. To induce self-affirmation, participants were then asked to write about their GPA and SAT scores, with the assumption that their scores would be higher; this was true for 98% of the women in this condition. In the study, women who engaged

in self-affirmation performed better than those who did not when exposed to stereotype threat.

Another means of countering stereotype threat involves misattribution—redirecting the cause of one’s stress to something non-threatening (Schachter & Singer, 1962). As an illustration of this tactic, a similar study by Ben-Zeev et al. (2005) had highly math-identified women take a challenging math test either with other women or with two men, a situation in which the women would be in the numerical minority. Before the test, participants sat near a subliminal noise generator and were told that the machine either produced a tone linked to negative physical side effects—the misattribution condition—or produced no such effects (Ben-Zeev et al., 2005). As predicted, women who were in the minority condition performed worse than those tested with other women when no alternative explanation for their anxiety was offered. However, when the misattribution cue was given by the subliminal noise generator, they did not show a decrease in performance in the presence of the men. This underscores the susceptibility of individual behavior to external influences and highlights the malleability of self-concept in response to contextual factors, such as assigning one a label. Taken together, this body of research suggests that labels do not simply influence how others perceive individuals, but can also shape how individuals understand and evaluate themselves. For instance, when individuals were guided to interpret their experiences through a particular lens, the effects of externally imposed labels were strengthened or weakened, supporting the idea that sustained attention to label-consistent behavior can produce shifts in said behavior and self-perception.

Cognitive accounts of labeling provide further insight into how such changes may occur. The

representational shift hypothesis proposes that activating a category label can bias how information is encoded and remembered, leading individuals to interpret experiences in ways that are consistent with that label (Lupyan, 2008; Kelly & Heit, 2017). Rather than immediately altering perception, labels may influence which aspects of experience are attended to and how those experiences are later recalled. Over time, this process may produce gradual shifts in self-concept as individuals increasingly interpret their behavior through the lens of the assigned label.

Statement of the Problem

The reviewed research indicates that labels, whether self-imposed or externally assigned, have profound implications for an individual’s self-concept, behavior, and experiences of stigma. However, due to the vulnerabilities and societal pressures that stem from labels, a critical question arises: can a label, particularly one provided by a trusted authority, influence an individual to behave consistently with that label and ultimately change their sense of self in the direction of that label? This question draws on insights from both stigma and stereotype research, as well as a modified labeling theory proposition from Kroska et al. (2015). To shortly define labeling theory, it is the idea that characterizing individuals by specific behavioral traits can influence their actions, effectively leading them to behave in ways that confirm those descriptions (American Psychological Association, 2023; Becker, 1963).

Previous research by Fox and Earnshaw (2023) and Warner et al. (1989) demonstrates that individuals who self-label with a mental illness experience greater internalized stigma than those who do not. Their findings demonstrate that

labels can shape one's self-perception. When this process is combined with findings from stereotype threat research, which reveal that false external descriptors can alter performance and behavior, a consistent pattern emerges: labels influence self-concept, which in turn shapes behavior and performance. Moreover, the modified labeling theory proposition adds that labeling increases one's vulnerability to external criticism (Kroska et al., 2015), which can reinforce self-doubt and foster further changes in self-concept. Over time, this recursive process could alter how individuals interact with the world as their changing perceptions of themselves reinforce the label's accuracy. This relates to the primary objective of this study: to examine the extent to which this cascading effect of labels—provided by a trusted source—can influence an individual's self-concept and personality, potentially leading them to exhibit symptoms or traits that are associated with the label.

Hypothesis

The question addressed in this study was as follows: if someone is given an empirically vetted personality test by a seemingly trustworthy individual, and they are given false feedback and asked to monitor behavior consistent with that feedback, would they come to perceive themselves as consistent with that false feedback? It is hypothesized that participants who receive false personality feedback and engage in sustained self-monitoring will exhibit changes in self-concept consistent with the assigned label, whereas participants who do not receive such feedback will show no significant change.

Methods

Subjects

Participants were 60 undergraduates, 18 or older, enrolled in the General Psychology SONA pool at Rutgers University-New Brunswick. A second group of 60 participants was recruited from another psychology class at Rutgers to serve as a control/baseline group for comparison. Participants were excluded from analysis if they failed to complete both the baseline and follow-up assessments, or if their responses indicated inattentive responding (e.g., selecting the same response option for all items on the Big Five Inventory-2 scale [BFI-2]). After applying these exclusion criteria, 38 participants in the control group had usable data. The control group's purpose was only to check whether the BFI-2 is reliable over a period of several weeks. Data from this group was not part of the experimental manipulation and, therefore, did not bear on the research hypothesis.

Measures

Participants completed the BFI-2 inventory, a standardized Big Five Inventory personality test, using an online Qualtrics survey. The BFI-2 is a 60-item test which has been validated and shown to be a reliable tool for assessing personality traits (Husain et al., 2025). This inventory assesses five different facets of personality; questions focusing on extraversion were used in this study (see Appendix A). Extraversion was chosen because most people are reasonably familiar with the terms “extraversion” and “introversion”, and these constructs are relevant to many behaviors, which makes it easy for participants to observe them in their daily lives. These questions were presented in a Likert-style format with five response options ranging from “disagree strongly” to “agree strongly”, following the original format from Soto & John

(2017). A prompt was shown telling participants to “please select the option next to each statement that indicates the extent to which you agree or disagree with that statement” (Soto & John, 2017). An example of one such statement is as follows: “Rarely feels excited or eager”. Following the assessment, each participant’s extraversion score (E-score) was calculated using a Microsoft Excel macro developed by clinical neuropsychologists Per-Ola Rike and Kristian Kohn in collaboration with Dr. Soto. This score was measured on a scale from one to five, with five indicating the strongest extraversion response.

Procedure

This study employed a longitudinal experimental design to investigate how false feedback provided by a trusted source influences self-concept. Participants were deceived into believing that this study’s goal was to measure changes in personality over time. Once enrolled, participants completed the BFI-2 inventory to establish a baseline measure of their personality traits and E-score. Then they were divided into two groups based on their E-scores. These groups were called E-group and I-group. Participants in the E-group scored below the midpoint of 3, meaning they leaned towards introversion (but will be asked to monitor their extraverted behavior). Participants in the I-group scored over 3, meaning they leaned towards extraversion (but will be asked to monitor their introverted behavior).

E-group Feedback Condition. Participants in the E-group viewed a brief three-minute video designed to enhance the credibility of the feedback process. The video began by presenting accurate information about the empirical validity and reliability of the BFI-2, establishing a

foundation of trust in the measure and its results. Following this introduction, the video displayed fabricated feedback, including a mock bell-curve graphic, suggesting that the participant’s responses leaned toward extraversion—although they actually scored on the introversion end of the scale. This moderate positioning between the midpoint and the higher end of the scale was selected to maximize plausibility and ensure the feedback appears realistic while remaining false. This is consistent with feedback and self-verification research, which suggests that individuals are less likely to accept feedback that sharply contradicts their existing self-conceptions (Ilgen et al., 1979; Swann, 1983). The feedback presented also incorporated Barnum-effect-style statements to describe what an introverted or extraverted leaning score suggests, thereby enhancing the credibility of the feedback. The Barnum effect has been used to describe a well-documented psychological phenomenon in which individuals perceive vague, general statements as highly personal and accurate (Meneghetti et al., 2016). The wording of the feedback was as follows for those receiving extravert feedback (see Appendix C, figure C2):

“Your results indicate that you have a slight lean towards extraversion. This means you may be outgoing, thrive in social environments, and possibly enjoy being around groups of people. However, being in large groups may still be draining over time and you may not always want to initiate conversations.”

I-group Feedback Condition. Participants in the I-group viewed a similar three-minute video, the only difference being that they were given fabricated data indicating that they leaned towards introversion—although they actually

scored on the extraversion end of the scale. The wording of the feedback was as follows for those receiving introvert feedback (see Appendix C, Figure C2):

“Your results indicate that you have a slight lean towards introversion. This means you are likely reflective, enjoy quiet settings, and thrive in one-on-one interactions or smaller groups. However, this does not mean you completely avoid large social activities and may still like the idea of going out from time to time.”

This style of feedback strategically balances both ends of the introversion-extraversion spectrum, acknowledging multiple facets of social behavior. As a result, participants should have been more likely to accept the feedback as accurate, since it resonates with diverse self-perceptions and allows room for personal interpretation (Meneghetti et al., 2016).

Post-Feedback Tasks and Follow-Up Procedures. After completing the initial survey and watching the video, participants completed an online attention-check questionnaire designed to ensure comprehension and recall of the feedback (see Appendix B). This brief assessment included questions about key details from the three-minute video, such as their reported personality score and its meaning. Following this, participants received daily Qualtrics surveys via email for a period of three weeks (see Appendix C). Each daily survey prompted participants to describe two experiences from their day that illustrated their assigned trait focus, introvert or extravert. At the end of the three weeks, all participants completed a follow-up online BFI-2 survey to assess any changes that may have occurred. They were then debriefed about the study’s true

purpose. The control group participants were not sent any results and were not asked to record experiences relevant to their trait label. They simply retook the BFI-2 survey after 3 weeks and could request their end-of-study results if they wanted to see them. Data from this group served as a check to see if extraversion scores were relatively stable over the time period of the study in a group not exposed to the manipulation.

Analysis

To assess whether participants were influenced by the false feedback, paired-samples *t*-tests were conducted to compare baseline BFI-2 personality scores with those obtained during the second administration. In addition, descriptive and thematic summaries of participants’ open-ended daily survey responses were used to identify recurring patterns in behaviors and reflections consistent with their assigned trait focus. This mixed approach allows for both statistical evaluation of measurable change and contextual interpretation of participants’ self-reported experiences. Together, these analyses provide a comprehensive view of how labeling by a seemingly credible source can shape self-perception over time.

Results

As shown in Table 1 (see Appendix D), paired-samples *t*-tests were conducted to evaluate whether changes in extraversion scores from baseline to follow-up were consistent with the assigned feedback conditions.

For the I-group, who received false feedback indicating a lean toward introversion, participants showed a statistically significant decrease in extraversion from baseline ($M = 3.61$, $SD = 0.42$) to follow-up ($M = 3.39$, $SD =$

0.47), $t(35) = -4.27$, $p < .001$, with a medium-to-large effect size ($d = -0.71$, 95% CI $[-0.34, -0.12]$). These results indicate a reliable shift toward more introverted self-perception.

For the E-group, who received false feedback indicating a lean toward extraversion, participants showed a small, non-significant increase in extraversion scores from baseline ($M = 2.48$, $SD = 0.40$) to follow-up ($M = 2.56$, $SD = 0.50$), $t(23) = 1.07$, $p = .295$, $d = 0.22$. This suggests that false extraversion feedback did not produce a statistically significant change in self-reported extraversion.

For the control/baseline group, paired-samples t -tests comparing overall extraversion scores at baseline ($M = 3.08$, $SD = 0.73$) and follow-up ($M = 3.06$, $SD = 0.69$) revealed no significant change, $t(37) = -0.41$, $p = .69$, $d = 0.06$. This indicates that the BFI-2 is stable across repeated administrations over the three-week time period for this study. Additionally, an independent-samples t -test comparing baseline extraversion scores between participants in the combined feedback conditions (I- and E-groups) and those in the control group revealed no significant difference, $p = .55$, suggesting that groups were comparable prior to the manipulation. Overall, these findings partially support the study's hypothesis: participants who received false introversion feedback and engaged in self-monitoring demonstrated a significant shift in self-concept consistent with the assigned label, whereas participants who received false extraversion feedback and those in the control condition did not exhibit comparable changes.

Discussion

The present study examined whether false personality feedback provided by a seemingly

credible authority, when paired with sustained self-monitoring, could alter individuals' self-concept in a direction consistent with the assigned label. Grounded in labeling theory and supported by findings from stigma and stereotype research, the study tested the proposition that labels can initiate a cascading process in which self-perception ultimately changes. The results partially supported this proposition. Extraverted scoring participants who received false feedback indicating a lean toward introversion exhibited a significant decrease in extraversion scores over time, whereas introverted scoring participants who received false extraversion feedback and those in the control/baseline group did not demonstrate comparable changes.

From a theoretical perspective, these findings are consistent with Kroska et al. (2015), who argued that labels can shape how individuals interpret and respond to self-relevant information. However, this study took this a step further and provided support for this effect occurring even if the information is false. This outcome is consistent with cognitive accounts of labeling that emphasize top-down influences on perception and memory. The representational shift hypothesis proposes that when a category label is active during information processing, memory representations become biased toward the prototype of that category, even when the original perceptual input is unchanged (Kelly & Heit, 2017; Lupyan, 2008). According to this framework, labeling does not necessarily alter immediate perception but instead shapes how experiences are encoded and later remembered by coactivating broad category knowledge alongside specific exemplars. Over time, this process may result in stored representations that are more consistent with the labeled category than with the original experience itself. Repeated

exposure to introversion feedback may have activated a broad “introverted” category that interacted with participants’ daily experiences during self-monitoring. When participants reflected on their behavior, attention may have been disproportionately directed toward category-consistent features mentioned in the feedback given to the participants during this study—such as preferring solitude or feeling socially drained—while counter-label behaviors were less salient. Through repeated daily reflection, this bias in encoding and recall may have accumulated, leading participants to remember their behavior in increasingly introversion-consistent ways. In line with the representational shift hypothesis, such top-down category activation could gradually distort autobiographical memory toward the introversion prototype, ultimately contributing to the observed shift in self-reported extraversion scores (Kelly & Heit, 2017). This process mirrors the recursive mechanism proposed earlier in this study: labels influence self-perception, which in turn shapes behavior and further consolidates the label’s meaning over time.

The absence of a comparable shift in the extraversion-feedback group suggests that labeling effects may not operate symmetrically across trait dimensions. One possible explanation is that the introversion-related characteristics given to the participants may have been more readily accessible for introspection and recall during daily reflection than the extraverted behaviors,—like “going out” or being in “large groups”—which often require situational opportunities (e.g., persons are always with themselves but are less often in groups). This finding suggests that the power of labels may depend not only on their credibility but also on how easily they can be incorporated into existing

self-schemas or confirmed by examples of relevant behavior.

Finally, the absence of change observed in the control indicates that the observed effects cannot be attributed to repeated testing or the passage of time. Participants who completed the BFI-2 twice without feedback or self-monitoring showed negligible change in extraversion scores, indicating that shifts in the I-group were driven by the labeling and self-monitoring manipulation.

Limitations

Several limitations should be considered when interpreting these findings. First, the study relied exclusively on self-report measures of personality, which may be influenced by demand characteristics such as participants’ beliefs about how they were expected to respond. Second, although attention checks were used to enhance credibility, this study lacked manipulation checks to assess whether participants were suspicious of the feedback. Third, the study did not directly assess compliance or depth of engagement with the daily reflections, limiting conclusions about the strength of the manipulation across individuals. Next, while the study was theoretically motivated by models—such as labeling theory and stereotype threat (Kroska et al., 2015; Mendes & Jamieson, 2011)—that emphasize vulnerability, vigilance, and sensitivity to evaluation, no direct measures of affective or physiological responses were collected. As such, conclusions about the internal processes underlying the observed changes must remain inferential rather than mechanistic. Finally, it is important to note that all groups in this study relied on psychology students, who may have had prior knowledge of Big Five

personality assessments and could have accurately predicted the study's manipulation.

Implications

Despite these limitations, the findings have important theoretical and applied implications. The results suggest that even mild, non-clinical labeling—when delivered by a trusted source and reinforced through repeated self-monitoring—can meaningfully alter self-concept. These results may have implications for clinical practice because clinical presentations have become increasingly complex, often involving overlapping symptoms, frequent comorbidities, and a lack of clear biological indicators (Ahmed et al., 2025). These challenges are compounded by external factors such as limited appointment times, clinician bias, inconsistent training, and systemic pressures to assign diagnoses for service eligibility. Together, these issues further heighten the risk of diagnostic errors in everyday practice. Due to this, it is important to examine the possible damages of misdiagnoses, and this exploration of the domain of mislabeling will provide a good foothold for future research to explore possible clinical applications.

This line of research is also relevant for educational and organizational contexts in which personality assessments, diagnostic labels, or evaluative feedback are frequently communicated as objective truths. If labels can initiate recursive changes in self-perception through increased attention to label-consistent behaviors, then inaccurate or premature diagnoses/assessments may inadvertently contribute to symptom amplification or identity shifts. These results reinforce calls for caution and further research in diagnostic communication. It also highlights the importance

of framing feedback in ways that minimize unintended identity consequences. More broadly, this study contributes to a growing body of literature demonstrating that self-concept is not a fixed entity, but a dynamic construct shaped by social context, authority, and attention. Labels do not merely describe individuals; they can actively shape individuals as well.

Future Research

Future research should seek to more directly examine the mechanisms underlying labeling-induced changes in self-concept. One promising direction involves incorporating physiological or affective measures to assess whether false feedback and sustained self-monitoring elicit changes in arousal, vigilance, or stress-related processes over time as seen in some stereotype threat research (Mendes & Jamieson, 2011). While the present study did not induce or measure stress, theoretical models of labeling and stereotype processes suggest that identity-relevant feedback may alter attentional and regulatory systems in subtle ways during distress. Additionally, future studies should provide participants with the opportunity to describe how they perceive themselves outside what is revealed from the measures provided, such as asking what they think they more lean towards—in this case either extraversion or introversion. This will allow researchers to see if a participant's self-concept matches what the measure, such as the BFI-2, says. For example, Swann (1983) showed that individuals who viewed themselves as assertive preferred feedback confirming that trait and resisted feedback suggesting they were unassertive. This tendency toward self-verification suggests that externally assigned labels may not always be readily adopted, particularly when they conflict with existing self-concepts. Future studies could

also extend the duration of follow-up to assess the persistence of labeling effects and examine whether changes in self-concept generalize to observable behavior or peer-reported outcomes. Finally, expanding the study to clinical or diagnostic contexts would help clarify the real-world implications of mislabeling and assess whether similar processes operate when labels carry greater social or institutional weight.

Conclusion

In conclusion, the present study supports that labels can influence self-concept when they come from a credible source and are reinforced through self-monitoring of consistent behaviors. By showing that false personality feedback can produce measurable shifts in self-perception, these findings extend labeling theory beyond traditional clinical contexts and highlight the dynamic nature of identity. More broadly, this work underscores the importance of how feedback is communicated, suggesting that labels do not merely describe individuals, but can play an active role in shaping who they become.

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Appendix A

Big Five Inventory-2

This was the Big Five Inventory-2 (BFI-2) that was used to obtain participants' extraversion scores. Participants completed all questions, but only questions focusing on the extraversion factor were used in this study. The extraversion questions were numbers 1, 6, 11, 16, 21, 26, 31, 36, 41, 46, 51, and 56 in the 60-item inventory (Soto & John, 2017).

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who *likes to spend time with others*? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

1 Disagree strongly	2 Disagree a little	3 Neutral; no opinion	4 Agree a little	5 Agree strongly
<i>I am someone who...</i>				
1. ___ Is outgoing, sociable.				31. ___ Is sometimes shy, introverted.
2. ___ Is compassionate, has a soft heart.				32. ___ Is helpful and unselfish with others.
3. ___ Tends to be disorganized.				33. ___ Keeps things neat and tidy.
4. ___ Is relaxed, handles stress well.				34. ___ Worries a lot.
5. ___ Has few artistic interests.				35. ___ Values art and beauty.
6. ___ Has an assertive personality.				36. ___ Finds it hard to influence people.
7. ___ Is respectful, treats others with respect.				37. ___ Is sometimes rude to others.
8. ___ Tends to be lazy.				38. ___ Is efficient, gets things done.
9. ___ Stays optimistic after experiencing a setback.				39. ___ Often feels sad.
10. ___ Is curious about many different things.				40. ___ Is complex, a deep thinker.
11. ___ Rarely feels excited or eager.				41. ___ Is full of energy.
12. ___ Tends to find fault with others.				42. ___ Is suspicious of others' intentions.
13. ___ Is dependable, steady.				43. ___ Is reliable, can always be counted on.
14. ___ Is moody, has up and down mood swings.				44. ___ Keeps their emotions under control.
15. ___ Is inventive, finds clever ways to do things.				45. ___ Has difficulty imagining things.
16. ___ Tends to be quiet.				46. ___ Is talkative.
17. ___ Feels little sympathy for others.				47. ___ Can be cold and uncaring.
18. ___ Is systematic, likes to keep things in order.				48. ___ Leaves a mess, doesn't clean up.
19. ___ Can be tense.				49. ___ Rarely feels anxious or afraid.
20. ___ Is fascinated by art, music, or literature.				50. ___ Thinks poetry and plays are boring.
21. ___ Is dominant, acts as a leader.				51. ___ Prefers to have others take charge.
22. ___ Starts arguments with others.				52. ___ Is polite, courteous to others.
23. ___ Has difficulty getting started on tasks.				53. ___ Is persistent, works until the task is finished.
24. ___ Feels secure, comfortable with self.				54. ___ Tends to feel depressed, blue.
25. ___ Avoids intellectual, philosophical discussions.				55. ___ Has little interest in abstract ideas.
26. ___ Is less active than other people.				56. ___ Shows a lot of enthusiasm.
27. ___ Has a forgiving nature.				57. ___ Assumes the best about people.
28. ___ Can be somewhat careless.				58. ___ Sometimes behaves irresponsibly.
29. ___ Is emotionally stable, not easily upset.				59. ___ Is temperamental, gets emotional easily.
30. ___ Has little creativity.				60. ___ Is original, comes up with new ideas.

Appendix B

Attention Check Questions

These were the questions that were given to participants via a Qualtrics survey and used as an attention check to ensure participants understood the feedback they received.

What was the range of scores for extraversion in the BFI-2 form you took?

☐ a minimum of 12, to a maximum of 60

☐ a minimum of 0, to a maximum of 6

☐ a minimum of 10, to a maximum of 70

☐ a minimum of 13, to a maximum of 42

What extraversion score did you get after taking the BFI-2 form?
(Use the slider to select your score)

12 17 22 26 31 36 41 46 50 55 60

BFI-2 Score



What does your extraversion score say about you according to your personalized video results?

Appendix C

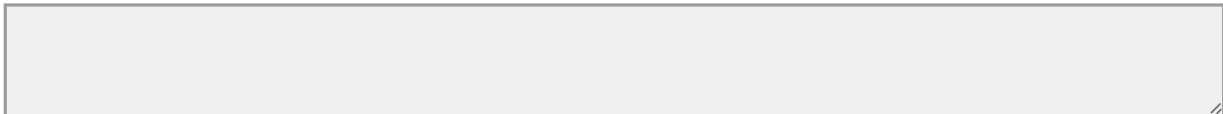
Daily Survey Questions

Figure C1

Extravert Daily Survey Questions

Dear participant we would like you to describe two instances in which you behaved in an extraverted manner today. These responses are open-ended and can be as short or as long as necessary. If you need a refresher on what extraverts are, here is a short recap: “Extraverts are characterized by expressive and outgoing patterns of behavior. They may enjoy being around others, enjoy larger social gatherings, and may like initiating conversations or being the center of attention. However, being in large groups may still be draining overtime, and you may not always want to initiate conversations.”

Please describe one instance today in which you behaved or had thoughts/feeling that reflect extraversion. (Note: If you can not come up with an example please explain why, or just use an example that you did not mention from yesterday)



Note. These survey questions were taken via Qualtrics. Below the text box would be another question with repeated wording asking participants to write down another instance of extraverted behavior.

Figure C2*Introvert Daily Survey Questions*

Dear participant we would like you to describe two instances in which you behaved in an introverted manner today. These responses are open-ended and can be as short or as long as necessary. If you need a refresher on what introverts are, here is a short recap: "Introverts feel more comfortable focusing on their inner thoughts and ideas, rather than what's happening externally. They enjoy spending time with just one or two people, rather than large groups or crowds. However, this does not mean you completely avoid large social activities and may still like the idea of going out from time to time."

Please describe one instance today in which you behaved or had thoughts/feeling that reflect introversion. (Note: If you can not come up with an example please explain why, or just use an example that you did not mention from yesterday)



Note. These survey questions were taken via Qualtrics. Below the text box would be another question with repeated wording asking participants to write down another instance of introverted behavior.

Appendix D

Table 1

Paired Samples t-test to Assess Change From Pre- to Post-False Feedback

Group	<i>N</i>	Baseline Mean (<i>SD</i>)	Post-Feed back Mean (<i>SD</i>)	<i>t(df)</i>	<i>p</i>	Cohen's <i>d</i>	95% <i>CI</i>
I-group	36	3.61 (0.42)	3.39 (0.47)	-4.27(35)	< .001	0.071	[-0.336, -.0119]
E-group	24	2.48 (0.40)	2.56 (0.50)	1.07(0.50)	0.295	0.22	—
Control	38	3.08 (0.73)	3.06 (0.69)	-0.41(37)	0.69	0.06	—

Note. Pre- and post-test scores reflect mean extraversion scores on the BFI-2 (Big Five Inventory-2). Cohen's *d* values represent standardized mean differences based on paired samples. Confidence intervals are reported where applicable. Control group participants did not receive false feedback or daily self-monitoring prompts.



Sleep Dysregulation in Alzheimer's Disease: Neurobiological Mechanisms and the Therapeutic Potential of Lemborexant

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Abstract

Alzheimer's disease (AD) is a progressive, neurodegenerative condition involving amyloid plaques, neurofibrillary tau tangles, inflammation, and cerebral atrophy. Recent evidence indicates that chronic sleep disorders may not only be a symptom of AD but also an important driver of its pathogenesis. This review presents the biological mechanisms underlying the link between abnormal sleep physiology and AD pathology, with an emphasis on the roles of the glymphatic system, the orexin signaling cascade, oxidative stress, and metabolic disturbances. Glymphatic system malfunction during sleep affects amyloid beta and tau protein clearance, whereas impaired orexin signaling maintains irregular sleep-wake patterns resulting in oxidative stress and neuroinflammation. The dual orexin receptor antagonist lemborexant, recently approved by the US Food and Drug Administration (FDA) as a sleep aid, is considered a potential therapeutic strategy for sleep-wake abnormalities associated with AD. Preclinical experiments and a Phase 2 double-blind, placebo-controlled, randomized study provide promising data on the benefits of lemborexant in patients with mild AD and irregular sleep-wake rhythm disorder. While these findings are preliminary, they support continued investigation into whether targeting the orexin system through lemborexant may help slow disease progression by addressing one of its most burdensome and potentially causative symptoms.

Keywords: Alzheimer's disease; sleep disorders; glymphatic system; orexin system; lemborexant; oxidative stress; circadian rhythm; dual orexin receptor antagonists

Author Contributions: Tim Starkweather served as lead for conceptualization, writing original draft, and writing—review and editing. Dr. Albin-Brooks contributed to supervision and writing—review and editing.

Introduction

Official mortality data from 2000 to 2024 indicates that while fatalities attributed to heart disease, the primary cause of death, fell by 2.1%,

documented deaths caused by Alzheimer's disease experienced a significant surge, increasing by 134.1% (Alzheimer's Association,

p. 44). Alzheimer's disease is the most common form of dementia (Centers for Disease Control and Prevention [CDC], 2024). It is a progressive neurodegenerative disease that gradually causes brain atrophy and impairs cognitive function, memory, and behavioral abilities (National Institute on Aging, 2023). The lethality of Alzheimer's disease not only stems from the disintegration of one's ability to eat or walk, but also several alternative complications that patients with Alzheimer's must cope with. Complications include an increased susceptibility to infections like urinary tract infections and pneumonia, falls (Alzheimer's Society, 2022), heart diseases or strokes (Tang et al., 2023), and dehydration or malnutrition (Perry et al., 2023). Symptoms of Alzheimer's disease typically appear in one's mid-sixties with the average life expectancy of 5.8 years after diagnosis (Centers for Disease Control and Prevention [CDC], n.d.). However, clinicians can extend life expectancy by up to twenty additional years when they diagnose Alzheimer's disease at an earlier, more mild stage (K2 Medical Research, 2024). Barriers to early diagnosis of Alzheimer's disease are often influenced by cultural norms and social stigma surrounding aging and cognitive decline ("Addressing Stigma Associated", n.d.). Early detection of Alzheimer's disease provides patients and clinicians with a greater opportunity to initiate treatment and slow disease progression. Even though there is no cure for Alzheimer's disease, there are several current treatment options that seem promising to help slow its progress. As technology advances, ongoing research continues to explore potential pathways for improving the treatment and management of the disease. Overall, this article argues that sleep dysregulation is not only a symptom of Alzheimer's disease but also a contributing factor to its underlying pathology, and that

targeting sleep mechanisms, particularly through orexin receptor antagonism, may offer a promising approach for managing disease-related symptoms.

The Importance of Sleep in Neurological Health

One factor that has gained increasing attention in understanding both the development and progression of Alzheimer's disease is the role of sleep. Sleep accounts for about one-third of our daily routine and is as important to our survival as food and water (National Institute of Neurological Disorders and Stroke, 2024). Scientists have uncovered several reasons why humans sleep, but the biological underpinnings of its purpose remain unknown. Sleep contributes to multiple aspects of neurological maintenance, including memory processing, emotional regulation, and brain restoration (Cleveland Clinic, 2025). When we sleep, the immune system becomes more active, especially the glymphatic system, which specializes in removing waste and toxins from the brain (Cleveland Clinic, 2025). In Alzheimer's disease, the glymphatic system malfunctions, leading to neuroinflammation and an excess amount of waste products such as amyloid plaques and tangles of tau protein (Buccellato et al., 2022). In typical, healthy individuals, tau proteins provide support to the neuron's axon by binding to microtubules (Fell, 2022). Accumulation of amyloid beta, due to the breakdown of the glymphatic system, causes tau proteins to become hyperphosphorylated, detached, and tangled, leading to neuron dysfunction and cell death (Hardy & Higgins, 1992). This evidence highlights that quality sleep is extremely important for ensuring proper functioning of glymphatic clearance of toxic waste products implicated in Alzheimer's disease. During sleep,

the glymphatic system is 90% more active, as brain cells shrink up to 60% (Reddy & van der Werf, 2020). This shrinkage greatly increases the interstitial space (the tiny, fluid filled gap between the brain cells and blood vessels, where the interstitial fluid (ISF), containing cerebrospinal fluid (CSF), acts as a transportation mechanism for nutrients and signaling molecules while simultaneously functioning as a waste removal channel, flushing out tau proteins and amyloid plaque through the ISF) (Shetty & Zanirati, 2020). The shrinkage that takes place in the brain when we sleep occurs, in part, due to our neuron's dendrites and synapses shrinking (Wanjek, 2017). Neuronal dendrites are small projections that extend from the neuron's cell body, which receive information from surrounding neurons through the synapse (the gaps between two interacting neurons where neurotransmitters are released into) when the cells are active (when we are conscious/awake) (Cline, 2017). Thus, the shrinkage allows for increased ISF and CSF flow and communication to help disperse nutrients and flush waste products (Shetty & Zanirati, 2020). Understanding these sleep-related biological processes provides a foundation for examining how sleep disruptions contribute to Alzheimer's pathology and how they may be therapeutically targeted. It is, therefore, especially important to evaluate the mechanisms of arousal and sleep regulation at the neurobiological level and how those cycles are regulated by the orexin system.

The Orexin System and Sleep Regulation

One of the primary neurochemical systems responsible for regulating sleep and wakefulness is the orexin system. Orexin, also known as hypocretin, is a neuropeptide that is produced by neurons in the hypothalamus (Peyron et al.,

1998). It has two subtypes: Orexin A and Orexin B. Their functions are mediated by two G-protein-coupled receptors: Orexin receptor 1 (OX1R), and Orexin Receptor 2, (OXR2). G-protein-coupled receptors (GPCRs) constitute the biggest group of cell-surface receptors in eukaryotes and are used as effective communication devices by cells for receiving stimuli from the environment and initiating an appropriate response inside the cell (Rehman & Dimri, 2023). Neuropeptides are excitatory and promote arousal and wakefulness (Saper et al., 2005). Therefore, when orexin peptides bind to either of its receptors, neuronal firing increases in regions that promote arousal. The excitatory mechanism stabilizes wakefulness and reduces unwanted drowsiness. In individuals with a normally functioning orexin system, the neuropeptide fires during the day and tapers off at night to promote restful sleep. There have been previous studies targeting mouse models that have shown how orexin might affect the development of Alzheimer's disease (Reynolds, 2023). Such studies involving transgenic mice models for Alzheimer's disease have shown that the orexin pathway controls the dynamics of amyloid-beta. According to Kang et al. (2009), an increase in orexin levels, combined with sleep deprivation, led to an increase in amyloid beta levels, whereas pharmacological inhibition of orexin receptors resulted in a decrease in amyloid deposition. Similarly, orexin knockout models (where scientists "knockout", or remove/genetically alter organisms so that they no longer produce orexin) showed significant reductions in amyloid plaque deposition, supporting a causal role of orexin in Alzheimer's pathology (Roh et al., 2014). The findings from these studies show that there may be a mechanistic link between sleep wake cycles, orexin signaling, and Alzheimer's pathology. Beyond neurochemical regulation, cellular

processes such as oxidative stress also play a critical role in linking sleep disruption to Alzheimer's pathology.

Oxidative Stress and Sleep-Wake Mechanisms

Although restoring regular sleep-wake patterns in Alzheimer's patients may appear straightforward, these disruptions often reflect deeper neurochemical dysfunctions that are exacerbated by chronic sleep deprivation. Research on insects in a study conducted by Sarnataro et al. (2025) have been used to compare metabolic processes in mammals, suggesting that sleep could have evolved across species as a way to manage oxidative stress. In this study, researchers examined specific neurons in the dorsal fan-shaped body (dFB) of fruit flies, which control sleep. They proposed that sleep pressure begins in the mitochondria due to aerobic metabolism and the leakage of electrons, which causes reactive oxygen species (ROS). An intracellular buildup of ROS creates oxidative stress, which signals the physiological need for sleep. Oxidative stress is the bodily condition that arises when there is a disturbance in the balance between ROS generation and the body's ability to excrete these damaging byproducts (Schieber & Chandel, 2014). If the ROS are not cleared, they could damage the cell and its components (Afzal et al., 2023). The dFBN neurons that were studied showed that fission and fusion cycles in the mitochondria regulate sleep balance. A similar process, as was pointed out in the study, occurs in mammals: mitochondria in hypothalamic neurons that regulate appetite (AgRP and POMC) undergo synchronized, opposing cycles of fission and fusion, which are linked to shifts in metabolic state. Their electrical activity increases after fusion, similar to the increased firing seen in dFBN neurons that promote sleep. This

cross-species connection suggests that sleep may have evolved as a universal strategy for managing the metabolic consequences of aerobic respiration. Excessive oxidative stress can damage mitochondrial DNA and generate toxic byproducts (Guo et al., 2013). This process is further shaped by the orexin system in humans. Oxidative stress contributes to tau pathology and participates in positive feedback loops that amplify Alzheimer's disease progression (Doig, 2018). Overall, the findings from Sarnataro et al. (2025) highlight how oxidative stress, sleep regulation, and mitochondrial processes are closely intertwined, with these underlying biological disruptions reflected in observable changes in sleep patterns and clinical symptoms among individuals with Alzheimer's disease.

Sleep Disruption and Alzheimer's Symptomology

Given that sleep is essential for human functioning, it is not surprising that sleep deficits are associated with significant physiological and cognitive consequences. For example, being in a sleep deficit has been shown to cause poor vigilance, poor executive functioning, low body temperature, decreased immune function, and increased blood pressure and appetite (Akhlaghi & Kohanmoo, 2023; Cao et al., 2025;). Symptoms of Alzheimer's share several characteristics of sleep deprivation. In fact, decreased deep sleep, due to insomnia, sleep apnea, etc., is associated with a higher risk of Alzheimer's later in life (Lucey et al., 2019, as cited in Bhandari, 2019). Uddin et al. (2020) found that changes in sleep structures, like less REM sleep, less deep sleep, and longer delays before REM begins, were observed in 66% of the study's research on patients with Alzheimer's disease. These disturbances result in increased nighttime activity and wakefulness, which pose a

significant challenge for caregivers and ultimately play a major role in the decision to place patients in long-term care (Beuckmann et al., 2021). Using a drug like lemborexant that specifically targets the efficiency and restoration of the sleep system in humans may help alleviate sleep-related symptoms associated with Alzheimer's disease. However, its effects on the broader progression of the disease remain unclear. Therefore, while improving sleep may help alleviate certain symptoms of Alzheimer's disease, further exploration into targeted treatments is necessary to determine the extent of these benefits. Given the strong connection between sleep disruption and Alzheimer's disease, researchers have begun to investigate targeted pharmacological interventions aimed at improving sleep quality.

Introduction to Lemborexant and Therapeutic Potential

Building on the connection between sleep disruption and Alzheimer's disease, researchers have begun investigating pharmacological interventions that specifically target sleep mechanisms. Pharmacological interventions targeting sleep are gaining increased attention as potential strategies for managing Alzheimer's disease. Lemborexant was developed for people who have insomnia (EISAI CO., 2025). It has had its efficacy tested in the treatment of Alzheimer's disease and its Initial Phase 2 clinical trial was in 2018 (EISAI Co., 2018). Eventually, a potential breakthrough in Alzheimer's research came about in 2025: lemborexant showed that it offered protection against several pathologies of the disease in mouse models (Parhizkar et al., 2025). As research in this field progresses, positive results seem to be on a steady trend supporting the possible causal role of poor sleep and cognitive

decline in Alzheimer's disease (Wade et al., 2014). Ultimately, the drug lemborexant may offer a promising treatment option for addressing sleep-related symptoms in Alzheimer's disease through neurophysiological mechanisms that promote more restful sleep and less daytime drowsiness. To evaluate its therapeutic potential, it is necessary to understand how lemborexant functions at a neurobiological level.

Mechanism of Action: Dual Orexin Receptor Antagonism

To understand how lemborexant may influence Alzheimer's-related symptoms, it is important to examine its mechanism of action within the orexin system. By bridging the gap between poor sleep and increased oxidative stress (Davinelli et al., 2024), lemborexant could potentially help improve the disrupted orexin signaling and impaired sleep through its mechanism as a dual orexin receptor antagonist (DORA). It was approved by the Food and Drug Administration in December 2019 for the treatment of adult patients with insomnia. Although there are no other diseases that are treated using lemborexant, it has been used to treat Irregular Sleep-Wake Rhythm Disorder (ISWRD) in Alzheimer's disease patients. Orexin A and Orexin B are the two subtypes of the orexin molecule. Orexin A can bind with both the OX1R and OX2R receptors, while Orexin B is more selective and binds only with the OX2R receptor (Sakurai et al., 1998). The orexin peptides are produced in the hypothalamus and project to dopaminergic, cholinergic, noradrenergic, or serotonergic neurons (Peyron, 1998). All of these neurons play some role in the mechanism of the sleep-wake cycle, making orexin peptides a dominant underlying support for this process. Wakefulness is produced by the agonism of OX1R and OX2R, while the inhibition of these

receptors results in sedative effects (Asnis et al., 2015; Murphy et al., 2017). Lemborexant is different from other drugs used to treat insomnia because it does not act on the GABA receptor but instead on the orexin receptor. By selectively targeting orexin receptors (instead of enhancing GABAergic inhibition like benzodiazepines and “z-drugs”) lemborexant avoids widespread central nervous system depression, which is often associated with cognitive impairment, motor incoordination, and respiratory suppression (Ardeljan & Hurezeanu, 2020). This more targeted mechanism may contribute to a lower risk of dependence, tolerance, and misuse compared to traditional sedative-hypnotic medications. Despite it being a promising drug, there are several side effects of lemborexant, which include complex sleep behaviors, sleep paralysis, drowsiness, somnolence, worsening of suicidal ideation or depression, and cataplexy similar behaviors (Fluyau et al., 2018). Its half-life, defined as the amount of time it takes for half of the drug to be eliminated from the body, is seventeen to nineteen hours in the five and ten milligram doses (Ardeljan & Hurezeanu, 2020). With its decreased side effects and targeted action on orexin receptors, lemborexant may represent a safer and more specific option for managing sleep disturbances in patients diagnosed with Alzheimer’s disease (Moline et al., 2021). Following an understanding of its mechanism, preclinical studies provide insight into how lemborexant affects sleep and Alzheimer’s-related pathology in controlled models.

Preclinical Evidence: Mouse Model Studies

Preclinical studies using animal models provide important insight into how lemborexant affects sleep regulation and Alzheimer’s-related pathology. In a research study using mouse

models, Beuckmann et al. (2021) administered lemborexant to see how genetically modified Alzheimer’s disease-like mice (SAMP8 mice) responded to the drug, as compared to the regular control group (SAMR1 mice). Researchers found that SAMP8 mice had high peak orexin levels during their sleep time, making them awake and alert, while the SAMR1 mice had normal, low orexin levels during their sleep time, making them tired and restful. By taking cerebrospinal fluid (CSF) samples, researchers found that lemborexant increased orexin levels in both groups of mice, yet still improved sleep quality. This may be counterintuitive because increased orexin levels typically coincide with the inverse: poor sleep and daytime drowsiness (Inutsuka & Yamanaka, 2013). The orexin found in the CSF was “freed”, exemplifying that the lemborexant was successfully blocking the orexin receptors. This study also found that, with a dose of thirty milligram per kilogram, both strains of mice absorbed the drug quickly (within a quarter of an hour). After one oral dose of lemborexant, the SAMP8 mice reached a higher peak drug concentration, as well as a higher area under the curve in the first hours after taking the drug. Essentially, SAMP8 mice absorbed more of the drug into their bloodstream faster than SAMR1 mice. However, the elimination rates between both groups were similar. This suggests that, while absorption differed, the drug was metabolized (the body used enzymes to break it down into smaller particles for therapeutic use and excretion) and cleared at comparable rates across all groups, indicating consistent pharmacokinetics that support its reliability in regulating sleep without prolonged cumulative effects. Researchers also measured both groups’ baseline and post-drug activity levels during their awake times. Before lemborexant, SAMP8 mice were active during their rest period and asleep during their active period. The drug

helped them reverse these patterns with no loss of activity relative to their baseline. This suggests that lemborexant had implications beyond sedation (Beuckmann et al., 2021). Although this study may be limited to models of mice under stricter conditions, it clearly sets the stage for future research on the efficacy of treating Alzheimer's disease with lemborexant by specifically targeting the Irregular Sleep-Wake Rhythm Disorder that is common among Alzheimer's patients. Building on findings from animal models, clinical studies further assess the effectiveness of lemborexant in human populations.

Clinical Evidence: Human Trials

In addition to animal studies, clinical research in human populations further evaluates lemborexant's efficacy in treating sleep disturbances associated with Alzheimer's disease. One human modeled study examined whether lemborexant could improve circadian rhythm and sleep in adult humans (60 to 90 years of age) with mild Alzheimer's disease and Irregular Sleep-Wake Rhythm Disorder (ISWRD) (Moline et al., 2021). This multicenter, phase two, double blind, randomized, placebo-controlled trial consisted of 62 patients placed in one of five groups: a placebo group, a group receiving a lemborexant dose of 2.5 milligrams, a dose of 5 milligrams, a dose of 10 milligrams, or a dose of 15 milligrams. The researchers found that the least active five hours (L5), which measures movement during the most still portion of the patients' twenty four hour period, was greatly decreased in the 2.5, 5, and 15 milligram groups. This suggests that lemborexant improved nighttime rest and less fragmentation of sleep. Furthermore, using actigraphy, researchers found that all lemborexant groups saw drastic improvement in

their relative amplitude. The relative amplitude measured helped them compare how each patients' day-to-night cycle improved. Lemborexant restored a more balanced circadian rhythm leading to more restful nights and more alert days. Another finding of this study was that lemborexant was able to reduce the need for unplanned daytime naps. Nighttime awakenings also decreased among the lemborexant 2.5 and 5 milligram groups. The 5 milligram group showed a consistent pattern of decreased sleep interruption throughout the four week treatment phase. Although this study offers preliminary evidence, its findings suggest that lemborexant may help manage one of the most burdensome symptoms of Alzheimer's disease: sleep disruption. In addition to sleep-related mechanisms, broader physiological processes such as metabolic dysfunction also contribute to Alzheimer's disease progression.

Metabolic Dysfunction: Insulin Resistance and Alzheimer's

Beyond sleep-specific mechanisms, metabolic dysfunction (particularly insulin resistance) also plays a significant role in the development and progression of Alzheimer's disease. Insulin resistance, as early as 2008, has been studied in Alzheimer's patients (Stranahan et al., 2008). "Type 3" Diabetes accurately reflects the interrelation between Type 1 and Type 2 Diabetes and how the disease manifests in its own, unique way to give rise to Alzheimer's disease (de la Monte & Wands, 2008). As previously discussed, oxidative stress plays a crucial role in Alzheimer's pathology due to Irregular Sleep-Wake Rhythm Disorder. Type 2 and Type 3 diabetes are not just caused because of problems with insulin-like growth factor (IGF) signaling or insulin, but also high oxidative stress, strong inflammatory responses,

DNA damage, and impaired mitochondrial functioning. All of these factors progress the disease by further increasing insulin and IGF resistance (de la Monte & Wands, 2008). If insulin resistance is a product of oxidative stress, and oxidative stress is a natural result of humans' evolutionary sleep-wake cycle, a buildup of oxidative stress (which leads to tau hyperphosphorylation) could be targeted to help treat Alzheimer's disease. However, further research is necessary since there is limited information on the role between treatment of AD by targeting oxidative stress. (Aborode et al., 2022). One potential way to indirectly influence oxidative stress is through drugs like lemborexant, which help regulate sleep-wake cycles; however, their direct impact on these underlying pathological processes remains to be investigated. Sleep, as a fundamental biological necessity, may play a central role in managing Alzheimer's disease, particularly when interventions occur early in its progression (Lv et al., 2022). The pattern that exists between oxidative stress and neuroinflammation is shaped by amyloid plaque's influence on insulin resistance which further proliferates the vicious cycle (Wei et al., 2021). Not only is tau hyperphosphorylation impacted by insulin resistance (Chatterjee et al., 2019), oxidative stress (Alavi Naini & Soussi-Yanicostas, 2015), and amyloid plaque (Rajmohan & Reddy, 2017), but cerebral atrophy, another symptom of Alzheimer's disease, is also correlated with the build-up of amyloid plaque (Ihle-Hansen et al., 2017). These metabolic and sleep-related disturbances are ultimately reflected in structural and functional changes within the brain.

Neurological Outcomes: Cerebral Atrophy and Sleep Disorders

Cerebral atrophy is another common characteristic noticed in Alzheimer's patients (National Institute on Aging, 2024). Research has shown that brain changes associated with Alzheimer's disease are linked with Type 2 Diabetes and poor glucose regulation (Sridhar, 2015). In one study conducted by Holingue et al. (2018), observed adults, aged seventy or older, maintaining poor glycemic control and having Type 2 Diabetes in midlife were connected to thinner cortex regions (especially similar to those that are affected in Alzheimer's disease), lower glucose use in those same areas, more cerebrovascular issues, and reductions in overall brain volume and hippocampal size later in life. An impaired ability to metabolize glucose has been shown to lead to brain atrophy. When key areas of the brain are unable to use fuel to function, it could also result in the shrinkage or apoptosis of neurons in those areas. If neurons are unable to metabolize glucose adequately, they may undergo degeneration and eventual cell death (SpinalCord, 2021). Further evidence relates known similarities between Obstructive Sleep Apnea (OSA) and symptoms of Alzheimer's dementia (Guay-Gagnon et al., 2022). People with OSA often experience issues with attention, executive functioning, motor abilities, and immediate and delayed memory (Krysta et al., 2017). Polysomnography tests used in research have shown that OSA is associated with reductions in the volume of several important brain regions involved in cognition. These reductions were apparent in areas such as: the cortical gray matter, the hippocampus, and the caudate (Holingue et al., 2018). Lemborexant has been shown to help improve sleep patterns and treat patients with Obstructive Sleep Apnea (Khullar et al., 2025). In conclusion, lemborexant appears to be a promising option for managing sleep-related symptoms in individuals with Alzheimer's

disease. However, its effects on other aspects of the disease remain to be fully understood. Taken together, the evidence highlights the complex interplay between sleep regulation, neurobiology, and potential therapeutic interventions in Alzheimer's disease.

Conclusion: Limitations, Implications, and Future Directions

Although the results are promising, there are a number of limitations which should be taken into account while assessing the possible use of lemborexant as an effective treatment option for patients with Alzheimer's disease. Despite the many strong findings thus far indicating the possible role of lemborexant in alleviating sleep disorders, it is important to recognize that Alzheimer's is a multi-faceted disease whose pathogenesis is still relatively unclear. It is unlikely that targeting sleep disturbances alone will be sufficient to halt or reverse disease progression. Moreover, as expanding research uncovers further findings, newer pathogenic pathways come to light, showing that a comprehensive, multifaceted approach is required in order to effectively treat the disease and its progression. Therefore, while lemborexant represents a promising avenue for managing sleep dysfunction, further research is necessary to determine its broader impact on Alzheimer's disease progression. These limitations underscore the importance of situating sleep-based interventions within the broader context of Alzheimer's disease pathology.

Diagnosing the disease early is essential to allow as much time as possible to treat and slow the progression of the neurodegenerative disease. According to the Alzheimer's Association (2025), demographic trends indicate that by

2050, the United States will require approximately 14,656 geriatricians to manage care for the projected 10.1 million older adults living with Alzheimer's dementia. This required workforce is more than double the 2021 supply, highlighting a severe impending shortage given that the number of active geriatricians has plateaued at roughly 7,000 annually over the past decade (pp. 66–67). Alzheimer's disease poses a threat both now and for the future. If no clear treatment option is discovered in the foreseeable future, the projected 12.7 million Alzheimer's disease patients may be left without an affordable, accessible, and effective treatment option. Breakthrough research in medications like lemborexant in Alzheimer's disease populations continues the steady march of research down a path that could eventually lead to an effective treatment option or even a preventative cure.

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Too Many Roles, Too Little Room to Breathe: Midlife East Asian Women, Caregiving, and Community Psychology

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Abstract

Midlife women in East Asian contexts increasingly occupy a “sandwich generation” position, balancing paid employment, intensive childrearing, and care for aging parents while remaining accountable to gendered expectations of being a “good” daughter, wife, and mother. Guided by a community psychology lens, this paper presents an interdisciplinary narrative review of how structural conditions and cultural gender norms converge to shape caregiver burden and the invisibility of distress in this population. Drawing primarily on scholarship from Chinese and Korean contexts, while also using Asian diasporic caregiving research and comparative familism scholarship where they clarify related mechanisms, this review argues that midlife women’s strain is not simply an individual time-management problem but a socially produced condition. Comparative work on familism, including Latino familism scholarship, is used as a conceptual lens to clarify how family obligation can provide meaning and social connection while also intensifying self-sacrifice, under-reporting of distress, and delayed help-seeking. The review also examines the limits of transferring Euro-American caregiver interventions into East Asian cultural contexts without adaptation to local family dynamics, moral norms, and community infrastructures. Overall, the review suggests that caregiver support should be culturally legible, relationally usable, and structurally responsive, rather than placing more demands on individual women to manage burdens produced by families, labor markets, and welfare systems.

Keywords: Sandwich generation; East Asian women; Confucian familism; caregiving; community psychology; caregiver burden

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Introduction

Consider a typical midlife woman in an East Asian city. At this stage of life, multiple pressures often converge: aging parents, adolescent children, full-time work, household

management, and the expectation that she will continue to hold family life together. Her partner may be present but not fully available as a source of care because gendered divisions of labor often leave women with primary responsibility for coordinating everyday family maintenance even when both partners are employed full-time. This pattern also resonates with the concept of the “second shift,” in which women’s entry into paid work does not eliminate their primary responsibility for unpaid domestic and caregiving labor, but instead often layers one set of demands onto another (Croft et al., 2014). What makes this position especially difficult is not only cumulative overload, but the sense that there is no safe space to fall apart. Many of the tasks she performs, including coordinating appointments, monitoring care, managing family conflict, sending money, and sustaining everyday order, are rarely recognized as labor. Instead, they are normalized as routine family work that women are expected to complete.

This social reality is often captured by the term sandwich generation, which refers to adults who are simultaneously supporting aging parents and younger dependents in the context of population aging and changing family structures (Rabi & Mansor, 2024). Yet this position is not simply demographic. Across many settings, women shoulder more unpaid care work than men even when they are also employed full-time, and in East Asian and Asian diasporic contexts these demands are further intensified by rapid population aging, uneven welfare provision, rising living costs, and persistent gender inequality in labor markets (Cook & Dong, 2011; Fang & Chan, 2024; Rabi & Mansor, 2024). Women face the brunt of sandwich-generation consequences because caregiving expectations are attached not only to family membership, but also to gendered ideas of proper womanhood,

marital responsibility, and filial virtue. This means that care labor is often treated as women’s natural duty rather than as work that should be shared, compensated, or institutionally supported. In Confucian-influenced settings, expectations of filial responsibility, family harmony, and gendered virtue can make caregiving feel morally non-negotiable, especially for women. As a result, the burden is not only materially heavy but also culturally normalized.

This paper argues that the strain carried by midlife East Asian women is best understood not as a problem of individual weakness or poor time management, but as the product of converging structural and cultural forces. This synthesis builds on prior scholarship showing that women’s caregiving strain is shaped by labor-market inequality, welfare retrenchment, and culturally normative family obligation, while extending that literature by bringing these strands together specifically in relation to midlife East Asian sandwich-generation women. Structural factors such as fertility-policy shifts, gendered hiring and promotion discrimination, motherhood penalties, pension insecurities, and limited long-term care provision disproportionately affect women, leading to increased financial risk and unpaid labor (Cook & Dong, 2011; Fang & Chan, 2024; Rabi & Mansor, 2024). Culturally, Confucian familism, filial piety, and gendered norms of respectability intensify expectations of endurance, emotional restraint, and family harmony while discouraging visible distress (Li, 2026; Wang et al., 2023). When these pressures converge, overload becomes both materially severe and socially normalized. Distress is therefore often under-reported, delayed in help-seeking, or internalized as personal inadequacy rather than

recognized as a predictable outcome of gendered structural strain.

Using a community psychology approach, this paper aims to review the literature on the cultural expectations surrounding caregiving for midlife East Asian women, with a focus on women in Chinese and Korean contexts. It also draws selectively on Asian diasporic caregiving research and comparative familism scholarship when those literatures clarify broader mechanisms of role strain, self-sacrifice, distress invisibility, and intervention fit. This comparative use does not assume that East Asian women in East Asia and East Asian women in diaspora experience caregiving in identical ways. In East Asian contexts, caregiving obligations are often shaped more directly by local welfare systems, labor markets, and family structures. In diasporic contexts, similar cultural norms may persist, but they are also reshaped by migration, racialization, language access, healthcare systems, and different forms of community infrastructure. The shared analytic focus, therefore, is not a single uniform “East Asian culture,” but the way gendered family obligation interacts with institutions to shape how women carry, interpret, and disclose caregiving strain.

Section 2 first examines Confucian familism, filial piety, and gendered norms of respectability, showing how they contribute to self-sacrifice, self-silencing, and the moral normalization of care. Section 3 then examines structural conditions, focusing on fertility-policy dynamics, labor-market discrimination, and welfare limitations that shift care responsibilities onto families. Section 4 reviews mental and physical health consequences, including role stress, symptom burden, and the under-reporting of distress. Section 5 considers the promise and limits of community-based and peer-led

interventions, with particular attention to cultural fit and the risk of individualizing structurally produced burdens. Section 6 concludes with implications for community psychology, research gaps, and future directions.

2. Cultural Context: Confucian Gender Norms, Familism, and Self-Silencing

2.1 Confucian Familism, Filial Piety, and the “Good Daughter-in-Law” Ideal

In many Confucian-influenced contexts, intergenerational support is framed less as a negotiable arrangement and more as a moral obligation (Li, 2026). In this review, Confucian familism, also referred to as Confucian familialism in some scholarship, refers to a family-centered moral framework in which individual behavior is evaluated through duties to parents, elders, spouses, children, and the wider family unit. Filial piety refers more specifically to the expectation that adult children should respect, support, and care for parents and elders. Together, familism and filial piety give caregiving a clear ethical meaning: being a “good” family member is demonstrated through meeting relatives’ needs, sustaining harmony, and placing collective stability above personal preference (Li, 2026; Wang et al., 2023).

This moral framing is not gender neutral. Li argues that Confucian ideology contains “prevalent gender discriminatory perspectives and discourse,” which shapes how moral virtue is assigned and evaluated (Li, 2026, p. 84). Confucian-inflected prescriptions about proper womanhood further define respectable femininity through obedience and domestic labor. For example, Li summarizes the “Three Obediences” as an obedience sequence in which a woman should “obey her father before she

marries, obey her husband after she has married, and obey her son after her husband's death" (Li, 2026, pp. 93–94).

She also describes the “Three Obediences and Four Virtues” as moral standards that historically “bound and oppressed women,” disciplining women’s behavior under a patriarchal gaze (Li, 2026, pp. 93–94). For midlife caregiving, the implication is practical: when women’s respectability is tied to obedience, self-restraint, and domestic competence, the home becomes a primary site where femininity is evaluated. Within patrilineal family logics, these pressures can intensify for daughters-in-law because caregiving for parents-in-law can function as evidence of loyalty and marital virtue rather than as a shared responsibility that can be freely negotiated. In such contexts, conflict-avoidance and face-management become part of caregiving labor itself: setting boundaries, refusing additional duties, or seeking outside services may be interpreted as disrespectful, unfilial, or as disrupting family harmony (Li, 2026).

Li also notes that gendered “female virtue” discourses can reappear in updated forms when the boundary between resisting such practices and endorsing “traditional culture” becomes blurred (Li, 2026, p. 93). In other words, the “good daughter-in-law” ideal is not sustained only through explicit teaching; it is reinforced through everyday norms about what a respectable woman should do, especially when family care demands escalate in midlife.

2.2 Familism, Self-Sacrifice, and Parallels With Latino Families

A cultural-model perspective suggests that familism norms can become everyday guidelines for what caregivers perceive as the “right” way

to act, making endurance and self-restraint feel morally meaningful rather than merely burdensome. In the Latino familism literature, attitudinal familism is often conceptualized across three dimensions: supportive familism, which refers to perceived closeness and support; obligatory familism, which refers to beliefs about family responsibility to provide support; and referent familism, which refers to behavioral alignment with family values and expectations (Marsiglia et al., 2009; Sabogal et al., 1987; Valdivieso-Mora et al., 2016). This framing is useful because it clarifies why familism can be psychologically double-edged. It can provide meaning, belonging, and perceived support, but it can also elevate perceived obligation and increase the costs of boundary-setting, making self-sacrifice more likely when demands accumulate.

A similar duality appears in East Asian caregiving research. In their systematic review and meta-analysis of East Asian dementia caregivers, Wang et al. (2023) argue that culture shapes not only caregiving values but also behavioral, cognitive, and affective processes, including illness perception, stress appraisal, coping strategies, and the use of informal and formal support. They identify filial piety, or the moral expectation that adult children should respect, support, and care for parents, as a central feature of East Asian caregiving culture. Rooted in Confucian traditions, filial piety is closely tied to ideals of family harmony and intergenerational obligation (Wang et al., 2023). At the same time, the review makes clear that such values are not uniformly protective. Cultural commitments may strengthen motivation to provide care and deepen the meaning attached to caregiving, but they may also increase obligation, constrain support-seeking, and negatively affect caregivers’ health. In this sense, East Asian

familism resembles Latino familism in its double potential, although its caregiving meanings are more explicitly tied to filial duty and harmony maintenance.

This interpretation also fits role-quality evidence from the Study of Women's Health Across the Nation (SWAN), a multiethnic community-based study of midlife women in the United States (Lanza di Scalea et al., 2012). In SWAN, Hispanic and Chinese women with high stress across roles showed lower odds of low social functioning than Caucasian women (Lanza di Scalea et al., 2012, p. 486). The authors discuss familism as a cultural resource relevant to both Hispanic and Chinese communities, emphasizing attachment and reciprocity as potential supports for functioning under role strain (Lanza di Scalea et al., 2012, p. 487). This pattern suggests a shared resilience pathway in which family-centered meaning and reciprocity may help preserve functioning under strain.

At the same time, the protective side of familism should not be confused with reduced burden. Evidence from Asian American caregiving research underscores the importance of role quality rather than role count. Jones et al. (2001) show that among Asian American women caregivers, support that helps women “decrease role stress” and “increase role satisfaction” may be more useful than reducing “the number of roles or the extent of involvement” (p. 143). Taken together, these studies support the central claim of this section: familism can offer meaning and support, yet when it is fused with gendered role expectations, it can also normalize self-sacrifice and make overload harder to name.

2.3 Gendered Shame, Respectability, and Emotional Regulation

Modern East Asian women are often expected to sustain competence in both public and private spheres, yet the terms of “success” remain gendered. Tabusa's metaphor of “Side A” and “Side B” captures this division: Side A refers to careers, politics, and economic participation, whereas Side B refers to caregiving, domestic labor, and embodied dependency (Uno & Tabusa, 2021). In practice, women are expected to move between both sides without being relieved of primary responsibility for family care. For midlife women, this arrangement becomes especially demanding because paid work often coincides with peak responsibility for both childrearing and elder care, turning role conflict into a chronic structural condition rather than a temporary scheduling problem.

A key cultural mechanism that stabilizes this unequal arrangement is emotional governance through shame. Li (2026) argues that Confucian moral cultivation has historically relied on shame as a mode of regulation, linking moral worth to self-correction and the internal management of emotion (p. 94). In contemporary settings, this logic can persist even when explicit “virtue” teachings are no longer formally endorsed. Li illustrates how seemingly minor practices, such as hair length or “slutty” red nail polish, become reputational tests that invite moral labeling (p. 94). The analytic value of this example is not the rule itself, but its psychological consequence: repeated exposure to narrow standards trains self-monitoring, discourages open disagreement, and raises the interpersonal cost of being perceived as inappropriate.

This emotional logic maps directly onto caregiving. In Holroyd's interviews with elderly Chinese wives, some participants explained caregiving with a simple role-based justification, “It's my role as a wife” (Holroyd, 2005, p. 444),

suggesting that obligation may become so deeply internalized that it is difficult to articulate as a choice or a burden. When caregiving is tied to respectability and role identity, distress becomes easier to interpret as personal failure than as a signal of overload. Emotional restraint, then, is not merely an individual coping style. It is a culturally reinforced strategy for remaining legible as a “good” woman under conditions of structural strain. Section 3 turns to the structural conditions that make this culturally normalized care burden materially difficult to sustain.

3. Structural Context: Policies, Labor Markets, and the Sandwich Generation

3.1 The Sandwich Generation as a Structural Rather Than Purely Demographic Condition

The rise of the sandwich generation is often described as a demographic development associated with population aging, longer life expectancy, and changing family structures, but it is more accurately understood as a structural condition shaped by how care, risk, and responsibility are socially organized (Pope et al., 2012; Rabi & Mansor, 2024). As more older adults live longer with chronic illness or disability, care responsibilities increasingly fall on adult children, many of whom are themselves in midlife and still supporting younger generations in some form. Family caregiving research further suggests that entry into caregiving is rarely a matter of pure individual choice. Rather, caregiving roles often emerge from preexisting family relationships, normative expectations, and the assumption that caring for aging parents is a legitimate or even expected task of adult life, especially for women (Pope et al., 2012).

What makes the sandwich-generation position analytically important, however, is that it is not distributed evenly across social settings. Policy-oriented work by Rabi and Mansor (2024) is useful here because it clarifies a broader structural mechanism: when pension systems, healthcare support, and long-term care provision are limited, families become the default site of risk absorption. In their analysis of Malaysia, sandwich-generation pressures intensify as fertility declines, longevity increases, and old-age dependency rises, while gaps in social protection leave many older adults reliant on their children for financial and practical support. They also note that middle-aged adults may be supporting not only young children but also financially dependent grown children, further expanding the scope of intergenerational responsibility (Rabi & Mansor, 2024). Although this is not an East Asian case, the mechanism is directly relevant to the present review because it shows how sandwich-generation burden is shaped not only by demographic aging, but by the extent to which welfare systems externalize care and financial risk to households.

In this sense, becoming “sandwiched” is not simply a private family circumstance. It reflects how care responsibilities are redistributed under specific policy, labor-market, and welfare arrangements, and within families these responsibilities often become gendered in practice. This structural perspective is essential for the present review because it shifts the question away from why some women “take on too much” and toward how societies organize care in ways that make overload more likely for midlife women in particular.

3.2 Fertility Policies and the Motherhood Penalty in China

In China, fertility policy and women's employment outcomes are closely intertwined rather than analytically separate. Although motherhood penalties are not unique to China, they take on a distinctive form in the Chinese context because changing fertility policies interact with already gendered labor-market expectations. As Fang and Chan (2024) argue, women's employment discrimination in China cannot be understood only as a general labor-market issue; it must also be examined in relation to fertility policy shifts and the expectations they create around childbirth and caregiving. This is especially relevant in the transition from the one-child to the two-child and now three-child policy era, where pronatalist goals may intensify employers' perceptions of women as "higher-risk" workers due to anticipated maternity leave, childrearing responsibilities, and longer-term caregiving interruptions.

The literature reviewed by Fang and Chan (2024) suggests that the motherhood penalty in China operates through several measurable pathways. Across studies, having more children is associated with lower labor-force participation, reduced working hours or labor-market attachment, and lower earnings for women. In other words, "labor supply" here refers not only to whether women remain employed, but also to the extent of their labor-market participation, including time worked and continuity of employment. Fang and Chan summarize evidence showing that each additional child is associated with an approximately 7% reduction in women's wages, with larger penalties as the number of children increases. They also review findings suggesting that higher fertility can push women into lower-quality employment, including informal work with lower pay and fewer training opportunities, reduce migrant

women's labor-force participation, and intensify earnings penalties under the universal two-child policy. Taken together, this literature indicates that childbearing in contemporary China continues to impose substantial economic penalties on women while leaving men's earnings comparatively less affected (Fang & Chan, 2024).

Importantly, the issue is not only childbearing itself or only policy, but the interaction between them. Fertility-policy expansion raises the social expectation that women should have more children, while labor-market institutions continue to treat women's reproductive and caregiving roles as private risks to be absorbed individually or within families. Cook and Dong's (2011) analysis helps clarify why this matters: under market reforms, enterprises became less willing to absorb caregiving costs, while childcare support, paid leave protections, and welfare guarantees were weakened or unevenly distributed. As a result, reproductive and care-related risks were increasingly shifted back to households, where women became the default absorbers of those costs (Cook & Dong, 2011). For midlife women, this creates a cumulative burden: many carry the long-term effects of earlier motherhood penalties while also facing rising elder-care responsibilities and growing employment insecurity later in life. In this sense, fertility policy functions not only as demographic policy but also as a gendered labor-market mechanism.

3.3 Paid Work vs. Unpaid Care: Harsh Choices Under Limited Welfare

Women's employment trajectories are shaped not only by fertility policies, but also by whether unpaid care is institutionally supported and redistributed. In reform-era China, discourses

that encourage women's economic participation have not been matched by an equivalent redistribution of family care responsibilities or by sufficiently robust public support for social reproduction (Cook & Dong, 2011). As a result, many women face "harsh choices" in which maintaining paid work must be negotiated alongside childcare, elder care, and household or marital obligations. These trade-offs may appear personal, but they are structurally produced.

Cook and Dong (2011) show that these pressures intensified under market reform through the substantial retrenchment of childcare support. As enterprises faced stronger profit pressures, most urban employers stopped providing subsidized childcare, and public provision also contracted. They report that a 2006 enterprise survey found that enterprises still running kindergartens accounted for less than 20% of SOEs and only 5.7% of all enterprises in the sample (p. 953). Publicly funded childcare also declined sharply as many facilities were closed or converted into fee-based services. Between 1997 and 2006, the number of publicly funded kindergartens fell substantially while private kindergartens expanded, raising concerns about declining availability, affordability, and quality (Cook & Dong, 2011, p. 953). When reliable childcare is inaccessible or unaffordable, women are more likely to move toward irregular hours, self-employment, temporary work, or other less protected arrangements that can be adjusted around family care.

This is why "flexible work" often becomes a necessity-driven accommodation rather than a genuinely self-directed choice. Flexibility may appear empowering on the surface, but under limited welfare conditions it often reflects the absence of affordable childcare, eldercare, or other forms of institutional support. Women are

not necessarily choosing flexibility because it offers better work-life balance; they may be pushed into it because other employment options are incompatible with uncompensated care demands. These arrangements can carry long-run penalties, including lower pay, weaker employment protections, interrupted career progression, and reduced access to benefits tied to formal employment (Cook & Dong, 2011). In this sense, limited welfare does not remove care burdens; it reallocates them.

Contemporary policy developments suggest some expansion of family support, but they also show that care remains only partially institutionalized. In January 2026, national reporting described a new round of applications for the nationwide childcare subsidy program, which offers a tax-free annual subsidy of 3,600 yuan for each child under age three and had already reached more than 24 million beneficiaries (Xinhua, 2026). This represents an expansion of direct childcare subsidies and family-support measures, but it does not fully resolve the underlying care-work conflict. Although such policies may ease some financial pressure, they still leave households responsible for managing the daily labor of care. For women, especially those already balancing paid work and intergenerational responsibilities, the result is that employment choices remain constrained by care obligations rather than freely chosen on equal terms.

3.4 Employment Discrimination, Decent Work, and Midlife Precarity

Employment discrimination in China is best understood as a cumulative process rather than a single hiring event. Gender bias can shape who is recruited, who is promoted, who receives training, and who gains access to the more stable

pathways of career development that lead to secure work and long-term earnings growth (Fang & Chan, 2024). In other words, discrimination does not only operate at the point of entry; it also affects the opportunities that determine whether women can move into better-paid, better-protected, and more sustainable forms of employment over time.

This cumulative process matters because it helps explain why midlife women often face labor-market precarity even when they remain highly active in both paid work and family care. Fang and Chan (2024) review evidence suggesting that women experience disadvantages not only in hiring but also in later stages of employment, including promotion and access to skill-building opportunities. They also cite experimental and audit-style findings showing that women applicants are less likely than men to be invited for on-site interviews under otherwise comparable conditions, indicating that gender bias can shape labor-market trajectories from the earliest stages of recruitment (see Fang & Chan, 2024). Once these disadvantages interact with earlier motherhood-related interruptions, they can accumulate across the life course and reduce women's ability to secure stable, higher-protection work later on.

For midlife women, these processes are especially consequential because this is precisely the period when elder-care demands intensify rather than recede. Employment precarity therefore cannot be understood only as an issue of individual qualifications or effort. It is shaped by institutional sorting processes that channel women into lower-pay, lower-protection, and lower-mobility employment pathways while continuing to rely on them as default providers of unpaid care. The result is a strenuous position in which women may remain employed, yet do

so under conditions of greater instability, weaker protections, and fewer realistic options for redistribution of care.

Taken together, Section 3 has shown that sandwich-generation burden is not simply the result of private family choices. It is structured by demographic change, fertility-policy dynamics, labor-market discrimination, and welfare arrangements that shift care, cost, and risk onto households, and within households disproportionately onto women. These structural pressures define the material conditions under which midlife East Asian women attempt to meet cultural expectations of being a “good daughter,” “good mother,” and “good wife.” Section 4 turns to how this cultural-structural combination becomes visible in mental health, physical health, and social functioning.

4. Health Consequences and the Invisibility of Distress

4.1 Role Stress, Role Rewards, and Mental Health (SWAN)

Using data from the Study of Women's Health Across the Nation (SWAN), Lanza di Scalea et al. (2012) show that midlife mental health is strongly associated with the quality of women's role experience across multiple domains. In this multiethnic, community-based U.S. study of midlife women, higher average role stress across roles was associated with more depressive symptoms, more anxiety symptoms, and lower social functioning, whereas higher average role reward showed the opposite pattern (Lanza di Scalea et al., 2012, Table 2). This overall pattern supports a key claim of the present review: midlife roles are not uniformly harmful or uniformly protective. Rather, the same family and work roles can be experienced as both

meaningful and stressful, and it is the balance between strain and reward that matters for mental health.

Significantly, the buffering effect of role reward was selective rather than general. In SWAN, reward helped attenuate the negative effects of stress primarily for social functioning, but not as consistently for depressive or anxiety symptoms (Lanza di Scalea et al., 2012, Table 2). This distinction is especially useful for the present review because it helps explain how distress can remain partly invisible. Women may continue to function across work and family roles, and may even appear socially competent, while still carrying elevated internal distress. In other words, functioning can be preserved without full psychological relief.

Within-role findings also suggest that caregiving carries a distinct risk profile. Caregiver stress was associated with poorer outcomes, including higher depressive symptoms and lower social functioning, whereas caregiver reward was not significantly protective (Lanza di Scalea et al., 2012, Table 2). This indicates that chronic care demands can translate into measurable distress even when caregiving remains meaningful or socially valued.

SWAN also helps explain why role quality may be especially salient for East Asian midlife women by showing that role occupancy patterns vary by race and ethnicity. Chinese women had the highest proportion currently employed for pay, and Japanese women had the highest proportion married or in a committed relationship, while the caregiver role was also not uncommon among Chinese women (Lanza di Scalea et al., 2012, p. 486). These distributions suggest that distress risk for East Asian women cannot be inferred from “having fewer roles.”

Instead, many are positioned in role ecologies that combine high labor-force participation with substantial family obligations. This pattern is consistent with the “double-demand” argument developed in Section 2: women may be expected to participate in paid work while still remaining primary managers of family care. Under these conditions, women can remain outwardly functional while accumulating substantial internal distress and long-term health risk.

4.2 Symptom Burden, Physical Health, and Quality of Life in Midlife Caregiving

Chronic caregiving in midlife is not only time-intensive; it can also become a direct source of physical and psychological symptom burden. Wang et al. (2023) note that family caregivers of people with dementia are “at risk of physical and mental health problems,” and that most patients with dementia are cared for at home by informal caregivers, usually family members, who often provide years of extensive care while lacking professional knowledge and care-related training (p. 1). They further summarize prior work suggesting that informal caregivers of older adults with dementia may face greater challenges and experience higher levels of burden and depression than caregivers of older adults without dementia (Wang et al., 2023, p. 2). This point is important because it frames caregiving not merely as a family role, but as a sustained health exposure. When caregiving is prolonged, the cumulative demands of supervision, emotional labor, and practical daily care can generate measurable strain even when caregiving remains meaningful or culturally valued.

Evidence from Asian American women caregivers also shows that the health costs of caregiving cannot be reduced to how many roles a woman holds. In Jones et al.’s (2001) study of

Chinese and Filipino American women caring for aging parents while also being wives, mothers, and employees, total role involvement was not correlated with overall health, current health, or psychological well-being in the combined sample (p. 139). By contrast, total role integration was positively associated with all three perceived health measures, whereas total role stress was negatively associated with overall and current health (Jones et al., 2001, p. 139). This distinction matters because it suggests that symptom burden in midlife is shaped less by role count alone than by whether multiple roles are experienced as integrated and manageable or as chronically stressful and conflicting. Consistent with this interpretation, Jones et al. conclude that support aimed at helping Asian American women caregivers “decrease role stress” and “increase role satisfaction” may be more useful than reducing “the number of roles or the extent of involvement” (p. 143).

These caregiving-related health strains unfold within a distinct physiological stage of life, which may further amplify symptom burden and quality-of-life decline. Jaisamrarn et al. (2025) emphasize that, for women in early midlife, the interplay between chronological aging and ovarian aging can substantially affect health and quality of life. They argue that hormonal fluctuations, subclinical inflammation, and micronutrient deficiencies should be understood together, because dysfunction across these domains contributes to menopausal symptoms, metabolic syndrome, impaired mobility, and neurocognitive change. They further note that vasomotor symptoms affect 34.5% to 61.0% of women in Asia and can persist for a median of 10.2 years, while also contributing to sleep difficulty, anxiety, and depression. These findings matter because role strain is occurring among midlife women at the same time that

fatigue, sleep disruption, mood symptoms, and reduced physical resilience are already becoming more likely. This helps explain why symptom burden and quality-of-life decline can accumulate even when women continue to meet everyday family and work obligations, making distress easier to normalize than to recognize as a health problem.

4.3 Why Distress Remains Invisible: Under-Reporting and Moralization of Suffering

Building on the cultural dynamics outlined in Section 2 and the structural conditions outlined in Section 3, distress remains invisible because endurance itself is moralized. In Confucian-inflected gender discourse, respectable femininity is tied to obedience, self-restraint, and women’s virtue, so complaint can be read less as a sign of overload than as a failure of proper womanhood (Li, 2026). Within this framework, the “good daughter” or “good daughter-in-law” is expected to preserve harmony, absorb strain, and continue functioning even when caregiving demands become untenable (Wang et al., 2023). The result is not only heavy burden, but a cultural tendency to treat suffering as something to contain rather than publicly name.

Wang et al. (2023) help clarify why this distress so often remains under-reported. Their review suggests that filial norms shape not only caregiving obligation but also which responses to strain feel morally permissible. Under filial pressure, some caregivers avoid external help, delay institutional placement, or fear criticism from the extended family because such actions may be seen as non-filial or as disrupting family harmony (Wang et al., 2023). At the micro-level, self-silencing often takes the form of not burdening others and withholding needs. In her

study of middle-aged Korean women managing chronic illness alongside family responsibilities, Park (2007) describes how women may “isolate themselves and aspects of their disease from friends and family” (p. 4). Holroyd’s interviews with elderly Chinese wives provide a parallel caregiving-specific illustration of reputational constraint: one wife explained that she could not leave because “Otherwise people (relatives and friends) will talk behind your back” (Holroyd, 2005, p. 444). In other words, silence is not only individual coping; it is also a socially enforced boundary around what can be expressed.

Park’s (2007) qualitative findings make this invisibility especially concrete. Middle-aged Korean women described feeling ashamed to talk about emotional or physical difficulties, not wanting to burden others, and sometimes believing that “hiding their difficulties from others was the virtue” (p. 99). Distress, then, is not absent; it is privatized, minimized, and morally absorbed. This also helps explain why conventional clinical or individual-level interventions may have limited effects: when silence itself is culturally rewarded, simply offering support does not ensure that women can comfortably disclose need or use that support. This invisibility matters not only descriptively but interventionally. If distress is under-reported because silence, endurance, and self-suppression are culturally rewarded, then support models that rely primarily on individuals alone may miss the problem at its point of production. Section 5 therefore turns to a central implication of this review: caregiver interventions cannot be evaluated only by whether support exists, but by whether they are culturally legible, relationally usable, and structurally responsive to the conditions that produce burden in the first place.

5. Community-Based and Peer-Led Interventions: Promise and Limits

5.1 Existing Models: Psychoeducation and Group- or Peer-Based Support

Existing caregiver interventions have often aimed to reduce burden through psychoeducation and group- or peer-based support. Psychoeducational models are built on a relatively straightforward premise: caregivers may cope more effectively when they better understand the illness, treatment process, coping techniques, and available resources (Chan et al., 2009). Psychoeducation can take multiple forms, including family psychoeducation, family therapy, professionally led education programs, and family-led support groups. Across formats, the core assumption is similar: knowledge, skills, and clearer guidance may improve caregivers’ confidence and help them manage strain more effectively.

Group- and peer-based models place greater emphasis on shared experience. Rather than relying only on professional instruction, these approaches assume that caregivers benefit from structured opportunities to discuss distress with others who understand the role, exchange practical strategies, and receive emotional and social validation (Swarbrick et al., 2025). A recent systematic review and meta-analysis found that peer support interventions for family caregivers of persons with dementia were associated with short-term improvements in perceived social support, health-related quality of life, and distress related to behavioral symptoms, although benefits were not sustained at follow-up (Xue et al., 2026). Taken together, these intervention models assume that distress can be named in interpersonal settings, that supportive others can help caregivers reinterpret

and manage burden, and that combining information with relational support may improve well-being. These assumptions are useful, but they require careful evaluation in East Asian contexts where disclosure, family obligation, and the meaning of “help” may be shaped by different cultural and structural conditions (Chan et al., 2009; Schwiebert & Myers, 1994; Xue et al., 2026).

5.2 Fit and Misfit for East Asian Midlife Women

Existing models generally assume that participants will benefit from naming burden, discussing emotional difficulties, and learning from others in shared settings (Schwiebert & Myers, 1994; Xue et al., 2026). Yet for women whose distress is shaped by moral expectations of endurance, restraint, and family responsibility, disclosure may be morally shameful (Park, 2007; Wang et al., 2023). When suffering is more likely to be hidden than publicly voiced, participation in support-oriented spaces may remain guarded, partial, or emotionally shallow rather than fully engaged (Park, 2007). The mere availability of support groups, then, does not necessarily guarantee strong uptake or sustained participation.

A second challenge concerns practical fit. Psychoeducation and peer support may offer useful knowledge, validation, and connection (Chan et al., 2009; Xue et al., 2026), but they also require time, scheduling, transportation, and emotional effort. For midlife women already balancing paid work, elder care, domestic labor, and family coordination, intervention participation may become an additional demand rather than a source of relief (Cook & Dong, 2011). As Cook and Dong (2011) argue, care responsibilities have increasingly been shifted

back to the household under reform conditions, leaving many women to absorb the costs of care through lost income, longer work hours, and reduced time for rest or personal development. In this sense, a model can be clinically sensible while remaining difficult to use in everyday life.

A third challenge is relational fit. Existing models often focus on the individual participant, but the burdens examined in this review are embedded in family obligation, reputation, and gendered expectations of care (Holroyd, 2005; Wang et al., 2023). Whether a woman can attend a group, seek outside help, or act on psychoeducational guidance may depend not only on her own willingness, but also on whether spouses, parents, or parents-in-law view such participation as legitimate, necessary, or disruptive to family responsibility (Holroyd, 2005; Wang et al., 2023). Wang et al. (2023) likewise suggest that under filial pressure, outside help may be delayed or avoided because it can be perceived as disruptive to family harmony or as non-filial. Under these conditions, interventions risk individualizing structural problems by treating distress as something women should better express and manage, even when that distress is continuously reproduced by unequal care arrangements and culturally sanctioned expectations of self-sacrifice (Cook & Dong, 2011; Wang et al., 2023).

5.3 From Imported Models to Culturally Grounded Questions

The limitations outlined above do not mean that psychoeducation, support groups, or peer support should be dismissed. A more useful next step is to ask what support would look like if it began from local family norms, moral expectations, and care infrastructures rather than assuming that imported models can simply be transferred

unchanged. If caregiving strain is organized through family obligation rather than individual choice alone, then the family or household, not only the woman herself, may need to become a unit of intervention and support (Holroyd, 2005; Wang et al., 2023). If burden is also sustained by the unequal distribution of paid and unpaid labor, then community-based support may need to do more than provide emotional validation. It may also need to connect women to practical resources, service navigation, and forms of material relief that actually reduce care load rather than simply helping them endure it (Cook & Dong, 2011).

This is where culturally grounded design questions become especially important. For example, peer support may be more usable if it is framed not only as a space to “share feelings,” but also as a setting for mutual aid, practical problem-solving, and resource linkage. In practice, this could mean peer groups that include guidance on navigating eldercare services, legal or benefits information, or connections to trusted community organizations, rather than relying only on verbal emotional disclosure. Depending on context, support may also be more culturally legible when delivered through existing community infrastructures, such as temples, neighborhood associations, senior activity centers, or other trusted local organizations, rather than only through formal mental health settings.

Rather than presenting a single solution, this review uses the limits of imported models to generate a set of culturally grounded questions. What would caregiver support look like if it began from East Asian family ideologies and community structures rather than from assumptions of individual disclosure and self-management? How might peer-led or

community-based interventions be redesigned so that they offer not only emotional support, but also practical relief and a redistribution of care responsibility? The issue, then, is not simply how to adapt Euro-American interventions at the surface level, but whether the unit of intervention, the site of support, and even the meaning of “help” itself need to be reconsidered.

6. Implications for Community Psychology and Future Directions

6.1 Implications for Community Psychology Theory

This review contributes to community psychology theory by identifying midlife East Asian sandwich-generation women as a critical population located at the intersection of gender, age, culture, and caregiving roles. Their distress is not adequately explained by models that treat caregiver burden as either a private family matter or an individual coping problem. Instead, the literature reviewed here suggests that burden is produced through the interaction of filial obligation, gendered moral expectations, and the unequal organization of paid and unpaid care (Cook & Dong, 2011; Holroyd, 2005; Wang et al., 2023). From a community psychology perspective, this means that caregiver distress should be understood not only as a clinical concern, but also as a community and policy issue. It is shaped by family norms, labor arrangements, service infrastructures, and the availability or absence of social supports that make care more or less sustainable in everyday life (Cook & Dong, 2011; Wang et al., 2023).

This review also suggests that community psychology should push beyond a narrow emphasis on individual empowerment when addressing women’s caregiving strain.

Empowerment remains important, but it is not sufficient if women are still left to absorb structurally produced overload on their own. A more adequate community psychology approach would link empowerment to redistribution: redistribution of care labor within families, redistribution of practical support through community systems, and broader advocacy around childcare, eldercare, pensions, and long-term care provision (Cook & Dong, 2011; Holroyd, 2005). In this sense, the present review argues that community psychology should not ask only how women can cope better, but also how communities, institutions, and policies can be reorganized so that coping is not the only option left.

6.2 Research Gaps and Future Directions

Several limitations in the current evidence base suggest important directions for future community psychology research. Existing reviews have examined adjacent areas, such as East Asian dementia caregiving (Wang et al., 2023), peer-support interventions for dementia caregivers (Xue et al., 2026), and familism in relation to Latino mental health outcomes (Valdivieso-Mora et al., 2016). However, to my knowledge, no review has brought these literatures together to examine midlife East Asian sandwich-generation women through a community psychology lens that integrates cultural expectations, structural conditions, and intervention fit. First, the literature reviewed here remains methodologically uneven. Wang et al. (2023) identified a relatively small body of East Asian caregiving studies that included both qualitative and quantitative work, indicating that evidence in this area is still fragmented. Chan et al. (2009) also noted that their psychoeducation study relied on self-reported measures, and Xue et al. (2026) found that peer-support

interventions showed some short-term benefits but no sustained effects at follow-up. Together, these studies suggest the need for more longitudinal and mixed-method research that can clarify how caregiver burden, distress invisibility, and support use unfold over time (Chan et al., 2009; Wang et al., 2023; Xue et al., 2026).

Second, intervention evidence remains mismatched with the specific population at the center of this review. Existing studies address adjacent groups—for example, midlife caregivers caring for aging parents, Chinese family caregivers in illness-specific contexts, or dementia family caregivers but relatively little work is designed specifically for midlife East Asian sandwich-generation women (Chan et al., 2009; Schwiebert & Myers, 1994; Xue et al., 2026). Future research should therefore prioritize culturally grounded intervention development rather than relying only on imported models or adjacent populations. Participatory and co-designed approaches with midlife caregivers would be especially valuable because qualitative work has already shown that burden, legitimacy, and help-seeking are deeply shaped by women's own lived experience of obligation, shame, and role conflict (Holroyd, 2005; Jones et al., 2001; Park, 2007).

Third, future work should move beyond content alone and pay closer attention to implementation. For East Asian women, a promising direction may lie not only in what support is offered, but in whether it is adapted to local settings, whether communities and organizations are ready to sustain it, whether it can actually reach women with limited time and emotional bandwidth, and whether broader policy and funding conditions make participation feasible (Wandersman et al., 2008; Wandersman, Chien, & Katz, 2012).

Comparative studies across East Asian societies and Asian diasporic communities may also help clarify which barriers are shaped more strongly by cultural norms, which by welfare and labor systems, and which by both (Jones et al., 2001; Wang et al., 2023).

6.3 Conclusion

In summary, the present review suggests that caregiver distress among midlife East Asian women should not be understood as a problem of individual weakness or poor coping alone. Rather, sandwich-generation burden is produced through the convergence of gendered moral expectations, family obligation, labor-market inequality, and uneven systems of care. A critical next step is to examine what kinds of support can be made genuinely fit into East Asian cultural contexts and diasporic settings where cultural norms, migration histories, and service systems may interact differently. Future work should pay closer attention to the mechanisms and implementation conditions that shape intervention success, including help-seeking stigma, adaptation to local settings, participant reach, and community readiness. Recognizing this is a necessary first step toward building communities in which care is distributed more fairly and midlife women are not expected to absorb the costs of care all alone.

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