

Unveiling the Mind: Analysing Undergraduate Women's Metacognitive Awareness, Rumination Patterns, and Readiness for Cognitive Change Following a Neuroplasticity Psychoeducation Session

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Abstract

Neuroplasticity is the brain's ability to change and adapt to situations. Understanding neuroplasticity can be a great leap for any who chance to work on one's mental wellbeing. Neuroplasticity-based psychoeducation — teaching that brain structure and function can be shaped in response to experience and repeated thought — is widely used in university wellbeing and mental health programs. Yet not much study is embarked on to how undergraduate students describe their own thought patterns in real, or how ready they feel to change them, immediately after encountering this framework for the first time. The objective of this study is to describe self-reported thought patterns, rumination tendencies, metacognitive discernment, and readiness for cognitive change among undergraduate women following a single psychoeducational session on neuroplasticity. A 19-item online questionnaire — combining categorical, Likert, and open-ended items — was completed by 91 female undergraduates (age 19–21 years) immediately after an in-person psychoeducational session on neuroplasticity. Closed-ended items were analyzed descriptively; open-ended responses were coded using inductive thematic analysis. Over half of participants (57.1%) described their everyday thoughts as a mix of positive and negative content. A third (36.3%) reported being caught in repetitive thought loops often or always. When asked what dominated their thinking, worry about the future (49.5%) and replaying past mistakes (34.1%) came up far more often than self-encouragement (31.9%) or gratitude (18.7%). Thematic analysis of open-ended responses found that feeling “not good enough” was the most common recurring negative self-belief (20.0%), and reducing social comparison was the most frequently named target for change (19.8%). Even so, participants reported strong willingness to work on their thinking ($M = 3.98$, $SD = 1.11$) and reasonable confidence in their ability to do so ($M = 3.73$, $SD = 1.03$). Most (72.5%) said they were ready to pursue change through neuroplasticity-informed practice. Ruminative and self-critical thought patterns were common in this sample, but so was openness to change.

Brief neuroplasticity psychoeducation appears feasible and acceptable as a starting point for cognitive or metacognitive intervention work with undergraduate women. Whether it produces any lasting shift in thinking or wellbeing remains an open question — one that controlled, longitudinal research is needed to answer.

Keywords: neuroplasticity; psychoeducation; rumination; metacognition; undergraduate women; mindset; thematic analysis.

1. Introduction

Decades of work in synaptic plasticity have shown that neural connections are continuously shaped by experience, learning, and habitual behavior — neurons that fire together tend to wire together (Hebb, 1949; Kandel, 2001). Over the past three decades, scholarship on neuroplasticity has expanded significantly, establishing it as one of the most transformative developments in contemporary science. Central to these discourses is a message of hope: that human narratives and lived experiences are not fixed, but can be reshaped, renewed, and re-authored in tandem with the brain's capacity for structural and functional change. In this sense, neuroplasticity underscores the possibility of simultaneous transformation—our stories evolving as our neural pathways are reconfigured (Thompson, 2021, 16:46). What has changed more recently is not the science itself but how far it has travelled: neuroplasticity has become a fixture in self-help culture, student wellbeing programs, and educational contexts, where it is offered as evidence that thought habits are not fixed and can, with effort, be changed (Doidge, 2007).

Translating that idea into a classroom setting is the premise behind neuroplasticity-based psychoeducation. These sessions teach students that their mental patterns are malleable and give them a biological rationale for deliberate cognitive self-improvement. Early evidence is encouraging. Neuroscience-informed psychoeducation has been linked to better metacognitive awareness in college students (Rezapour et al., 2025), and university-based psychoeducation programs more generally have been associated with lower academic distress and more positive help-seeking attitudes (Savell et al., 2024). This connects to a longer-standing body of work on implicit theories of intelligence: when students believe their abilities can grow, they tend to handle setbacks better and sustain effort longer (Dweck & Leggett, 1988; Yeager & Dweck, 2020). Neuroplasticity psychoeducation gives students a concrete, biologically grounded way to hold that belief.

The thinking patterns these sessions are designed to address are themselves well documented. Repetitive negative thinking (RNT) — the tendency to mentally rehearse worries and past mistakes in loops — is more prevalent among university students than in the general population and is a transdiagnostic risk factor for both anxiety and depression (Ehring & Watkins, 2008; Inostroza et al., 2024). Fine-grained ecological momentary assessment data show that on days when RNT is elevated, students report lower self-esteem and higher burnout, and the effect is visible within a single day (Brueckmann et al., 2025). Prevention programs

specifically targeting RNT in student populations are now being trialed at scale (Watkins et al., 2024). All of this makes the basic question of what students think about their own thinking — and how ready they feel to change it — a practically important one.

Surprisingly, that basic question is hard to answer from the existing literature. Most published work on neuroplasticity-based interventions reports symptom change across multi-session programs with pre- and post-measurements (e.g., Rezapour et al., 2025). What students report at the moment of first exposure — how they characterize their own thought patterns, what they identify as barriers, and how willing they actually feel to change — has rarely been examined descriptively. This is a gap worth filling: a clear descriptive baseline is necessary before we can design, or interpret controlled trials.

This study addresses that gap. A post-session questionnaire data from 91 undergraduate women who had attended a single psychoeducational session on neuroplasticity and brain rewiring. Three questions guided the analysis:

- (1) How prevalent are self-reported ruminative and self-critical thought patterns in this sample, and what do they look like?
- (2) How do participants rate their own metacognitive discernment, willingness to change, and confidence in their ability to do so?
- (3) What themes emerge from participants' open-ended accounts of their recurring negative beliefs, the mental habits they want to change, and their vision of who they could become?

This is a descriptive, cross-sectional study. The study does not claim that the session caused any change. Instead it offers a detailed snapshot of how one group of undergraduate women thought about their own minds at the moment neuroplasticity was first administered to them as a framework — and what they thought about it.

2. Methods

2.1 Design and Setting

This was a single-timepoint, cross-sectional survey administered after a neuroplasticity psychoeducation session delivered to undergraduate students. There was no pre-session baseline, no comparison group, and no follow-up. The design is therefore suited to describing how participants characterized their own thought patterns and readiness for change at the point of first exposure to this content. It cannot support any inference about what the session caused.

2.2 Participants

Ninety-one undergraduate students completed the questionnaire. All were female, aged between 19 and 21 years. Participation was voluntary and uncompensated. The sample is a convenience sample drawn from a

single institution, which limits how far the findings can be generalized — to other settings, genders, age groups, or delivery formats.

2.3 Procedure

The psychoeducational session covered the brain's capacity for structural and functional change in response to repeated thought and behavior, and presented the idea that habitual thinking patterns can be reshaped through deliberate practice. Immediately afterward, participants were invited to complete an anonymous online questionnaire. All responses were collected over six days, between June 16 and June 22, 2026. No personally identifying information was collected at any point.

2.4 Measures

The questionnaire contained 19 substantive items covering five broad areas: (a) general tone and frequency of everyday thoughts; (b) typical responses to negative events and social feedback; (c) dominant thought content and self-awareness around negative thinking; (d) reaction to the neuroplasticity premise, perceived barriers to change, and self-rated willingness and confidence to change; and (e) open-ended reflections on recurring negative beliefs, desired habit changes, and a personal vision of self-improvement. Three items used 5-point Likert scales; one used a multiple-response format (select all that apply); three were open-ended free-text items; the remainder were single-select categorical. Full item wording is available from the corresponding author.

2.5 Data Analysis

Categorical items were summarized as frequencies and percentages. For the multiple-response item on dominant thought content, percentages were calculated against the total number of respondents, since participants could select more than one option. Likert items were summarized with means and standard deviations.

The three open-ended items were analyzed using Braun and Clarke's (2006) inductive thematic coding approach. Each response was fully read before any coding began, and categories were built from the data rather than fitted to a pre-existing framework. Responses consisting of single characters, test entries, or clearly unrelated text were excluded from the analytic denominator and reported as a data-quality count. Responses that explicitly denied any recurring belief or desired change (e.g., "no" or "nothing") were kept in the analysis and coded as "none reported" rather than treated as missing, since they represent a genuine answer. Where a single response touched on more than one theme, it received more than one code. All coding was done by a single researcher; inter-rater reliability was therefore not calculated, and this is acknowledged as a limitation. Percentages for each theme are reported relative to the number of substantive responses for that item.

All quantitative analyses were conducted in Python (pandas, version 2.x). No inferential statistical tests (e.g., chi-square tests of association, correlations) were conducted; given the absence of a priori hypotheses about between-variable associations and the descriptive, exploratory aims of this study, the study is restricted to analysing descriptive statistics and qualitative thematic coding.

2.6 Ethical Considerations

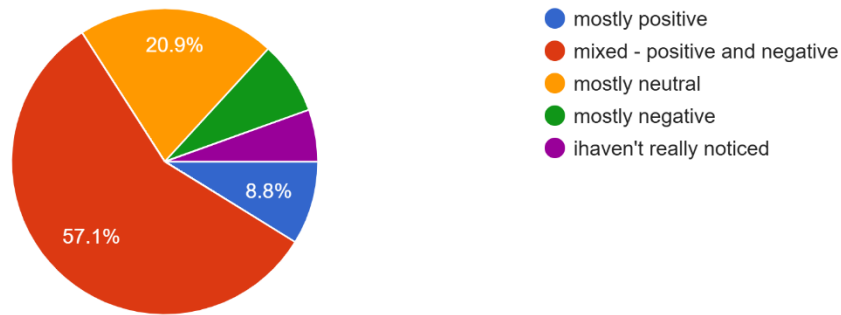
The study followed established ethical standards for research involving human participants, and approval was obtained from the Institutional Ethics Committee of the host institution prior to data collection. Participation was entirely voluntary, and individuals were informed of their right to withdraw at any stage without penalty or negative consequences. Confidentiality and anonymity were safeguarded by removing personal identifiers from the dataset and presenting results only in aggregate form. The study posed minimal risk to participants, and every precaution was taken to protect their physical, psychological, and emotional well-being throughout the research process.

3. Results

All 91 participants completed the questionnaire comprising categorical, Likert-scale, and open-ended items. Descriptive statistics were applied to closed-ended items, while open-ended responses were examined using inductive thematic analysis. Overall, ruminative and self-critical thought tendencies were common within this cohort, yet accompanied by notable openness to change. These findings suggest that brief psychoeducation on neuroplasticity is both feasible and acceptable as an entry point for cognitive or metacognitive interventions among undergraduate women. However, the durability of such effects on cognition and well-being remains uncertain, underscoring the need for controlled longitudinal research.

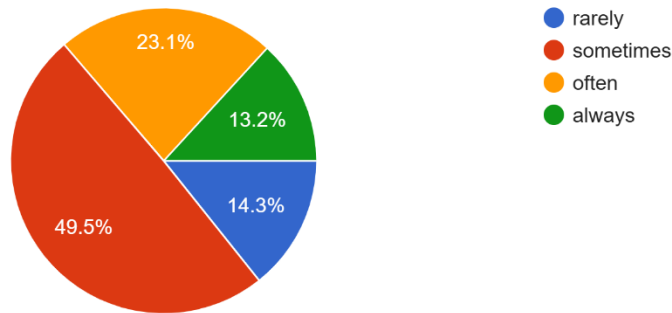
3.1 Self-Reported Thought Patterns

Figure 1 and Table 1 summarize the self-reported tone of everyday thinking and frequency of repetitive thought loops of the participants. A majority of participants (57.1%) characterized their everyday thoughts as a mix of positive and negative content, while smaller proportions reported predominantly neutral (20.9%), predominantly positive (8.8%), or predominantly negative (7.7%) thought content. Regarding repetitive thinking, almost half of participants (49.5%) reported being caught in repetitive thought loops “sometimes,” and over a third (36.3%) reported this occurring “often” (23.1%) or “always” (13.2%); only 14.3% reported this occurring “rarely.”

Fig 1. Self-reported tone and frequency of everyday thought patterns (N = 91)**Table 1. Self-reported tone and frequency of everyday thought patterns (N = 91)**

Response category	N	%
How would you describe your everyday thoughts?		
Mixed — positive and negative	52	57.1
Mostly neutral	19	20.9
Mostly positive	8	8.8
Mostly negative	7	7.7
Haven't really noticed	5	5.5

Regarding repetitive thinking, almost half of participants (49.5%) reported being caught in repetitive thought loops “sometimes,” and over a third (36.3%) reported this occurring “often” (23.1%) or “always” (13.2%); only 14.3% reported this occurring “rarely.”

Fig 2. Self-reported tone and frequency of everyday thought patterns (N = 91)

Response category	N	%
How often do you feel caught in repetitive thought loops?		
Sometimes	45	49.5
Often	21	23.1
Rarely	13	14.3
Always	12	13.2

When asked what their mind tends to drift to during unstructured free time (Fig 3, Table 3), the most frequently endorsed category was future plans and goals (38.5%), followed by nothing in particular (23.1%) and past regrets or memories (16.5%); worries and fears were endorsed by 7.7% of participants as their dominant drift content.

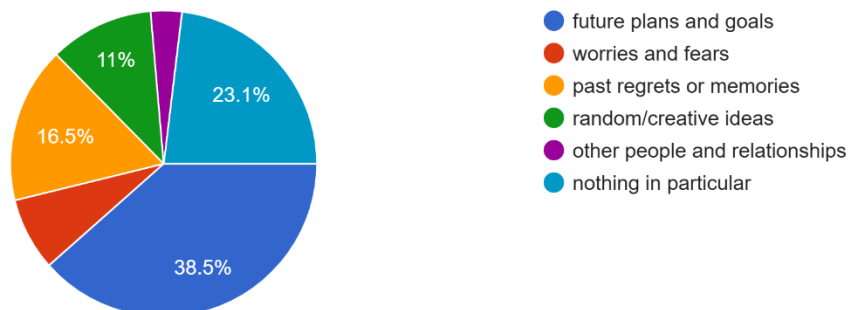
Fig 3. Reported content of mind-wandering during unstructured free time (N = 91)

Table 3. Reported content of mind-wandering during unstructured free time (N = 91)

Response category	N	%
Future plans and goals	35	38.5
Nothing in particular	21	23.1
Past regrets or memories	15	16.5
Random/creative ideas	10	11.0
Worries and fears	7	7.7
Other people and relationships	3	3.3

Participants' typical responses to a negative event and to receiving a compliment are summarized in Table 3. The most common first instinct following a negative event was an active, solution-focused response (“How can I fix this?”; 53.8%), although a combined 26.4% of participants reported either self-blame (“This is my fault”; 8.8%) or externally attributed distress (“Why does this always happen to me?”; 17.6%).

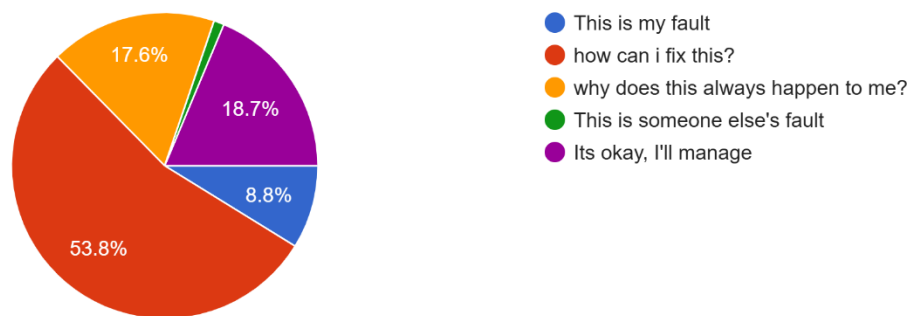
Fig 4. Typical responses to a negative event and to receiving a compliment (N = 91)

Table 4. Typical responses to a negative event and to receiving a compliment (N = 91)

Response category	N	%
First instinct after something goes wrong:		
How can I fix this?	49	53.8
It's okay, I'll manage	17	18.7
Why does this always happen to me?	16	17.6
This is my fault	8	8.8
This is someone else's fault	1	1.1

In response to a compliment, just over half of participants (51.6%) reported feeling happy and motivated and a further 27.5% reported accepting it genuinely; however, 20.9% reported a self-doubting or self-critical response (doubting the compliment's sincerity (12.1)%, immediately thinking of personal flaws (5.5%), or feeling embarrassed (3.3%)).

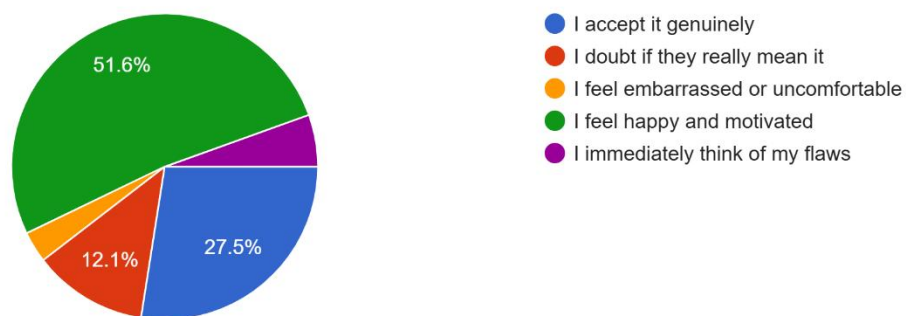
Fig 5. Typical responses to a negative event and to receiving a compliment (N = 91)

Table 5. Typical responses to a negative event and to receiving a compliment (N = 91)

Response category	N	%
Typical response to a compliment:		
I feel happy and motivated	47	51.6
I accept it genuinely	25	27.5
I doubt if they really mean it	11	12.1
I immediately think of my flaws	5	5.5
I feel embarrassed or uncomfortable	3	3.3

Asked how honestly they confront their own negative thoughts, 39.6% reported facing them honestly, while a combined 52.8% reported either trying to distract themselves (27.5%) or noticing but ignoring them (25.3%); 7.7% reported not having previously been aware they engaged in this pattern.

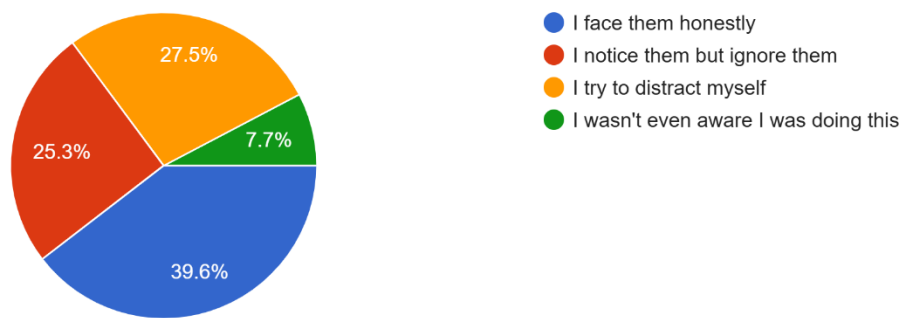
Fig 6. Typical responses to how honestly they confront their own negative thoughts

Table 6. Typical responses to how honestly they confront their own negative thoughts (N = 91)

Response category	N	%
Typical response to a compliment:		
I face them honestly	36	39.6
I try to distract myself	25	27.5
I notice them but ignore them	23	25.3
I wasn't even aware I was doing this	7	7.7

Figure 7, Table 7 reports the unpacked results of the multiple-response item asking participants which type(s) of thought occupy most of their mental space (respondents could select more than one category, so percentages do not sum to 100%). The two most frequently endorsed categories were both negatively valenced: unnecessary worry about the future (49.5% of respondents) and replaying past mistakes (34.1%). Positive self-encouragement was endorsed by 31.9% of respondents and necessary problem-solving by 27.5%, while explicitly self-deprecatory negative self-talk (20.9%), gratitude (18.7%), and comparison with others (14.3%) were endorsed less frequently.

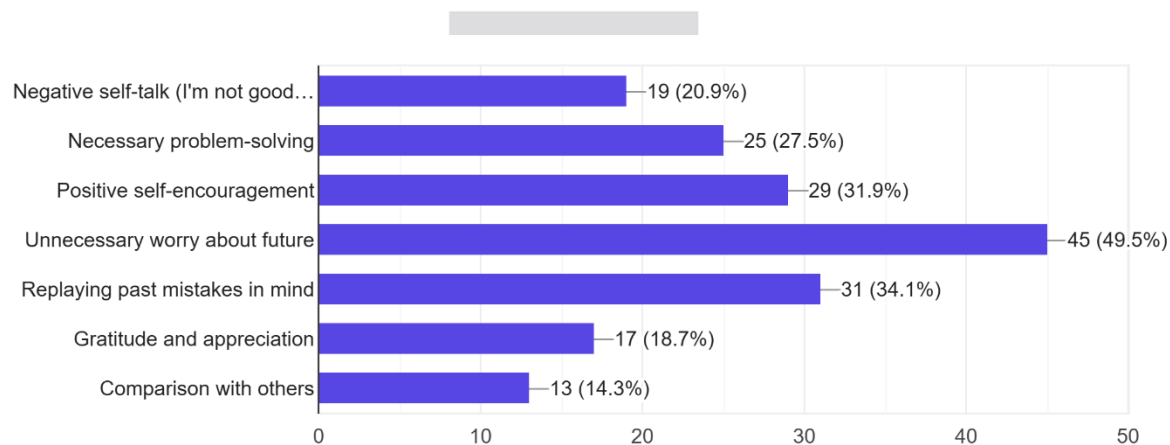
Fig. 7. Dominant thought content (multiple-response item; N = 91 respondents, percentages do not sum to 100%)

Table 7. Dominant thought content (multiple-response item; N = 91 respondents, percentages do not sum to 100%)

Response category	N	%
Unnecessary worry about future	45	49.5
Replaying past mistakes in mind	31	34.1
Positive self-encouragement	29	31.9
Necessary problem-solving	25	27.5
Negative self-talk (“I’m not good enough”)	19	20.9
Gratitude and appreciation	17	18.7
Comparison with others	13	14.3

3.2 Metacognitive Discernment, Reaction to Neuroplasticity Content, and Readiness for Change

Self-rated ability to discern which thoughts are worth one's attention (1 = low, 5 = high) was moderate ($M = 3.30$, $SD = 1.14$), with the modal response at the scale midpoint (41.8% selecting 3) and a roughly even split above and below this point (38.5% selecting 4 or 5; 19.8% selecting 1 or 2).

Reaction to the core neuroplasticity premise (that thought patterns are changeable through deliberate practice) was predominantly favorable but mixed in confidence (Table 5): 28.6% reported feeling “hopeful but unsure,” 20.9% “excited” and ready to apply the concept, and a combined 24.2% reported already being familiar with the idea (whether or not they had previously acted on it). Notably, 17.6% reported feeling overwhelmed and unsure where to start, and 8.8% expressed skepticism.

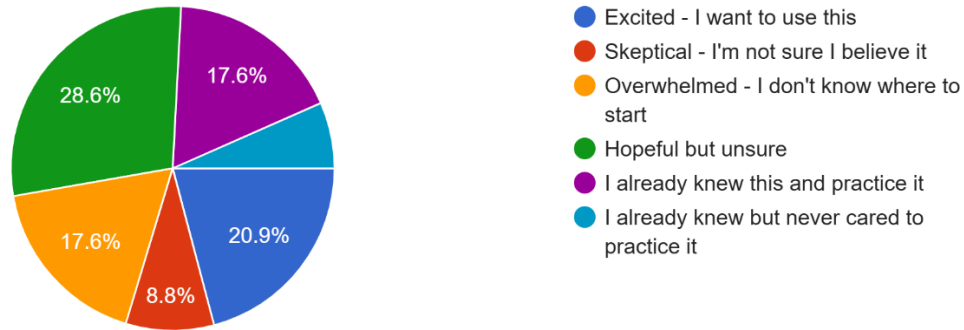
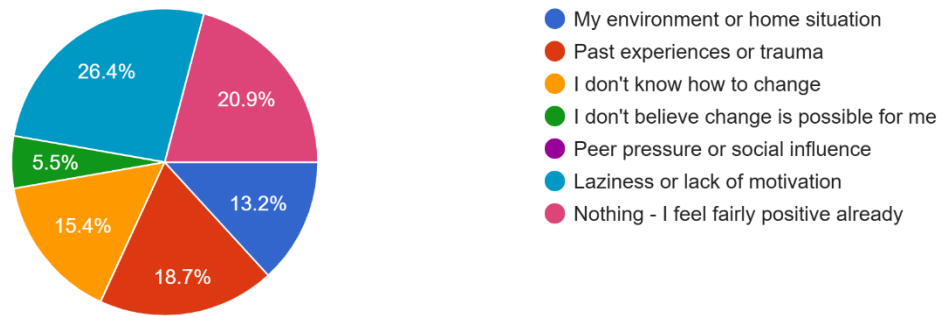


Table 8. Reaction to the neuroplasticity premise that thought patterns can be deliberately changed (N = 91)

Response category	N	%
Hopeful but unsure	26	28.6
Excited — I want to use this	19	20.9
Overwhelmed — don't know where to start	16	17.6
Already knew this and practice it	16	17.6
Skeptical — not sure I believe it	8	8.8
Already knew but never practiced it	6	6.6

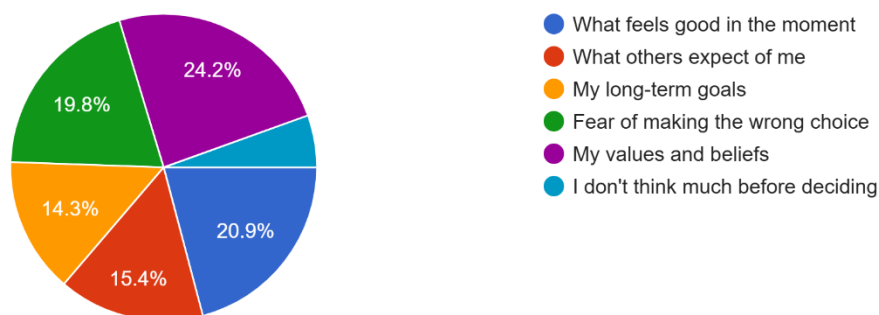
Self-rated willingness to work on changing one's thinking was the highest-scoring Likert item in the survey ($M = 3.98$, $SD = 1.11$), with 66.0% of participants selecting 4 or 5 on the 5-point scale and only 8.8% selecting 1 or 2. Self-rated confidence in one's own capacity for positive change was somewhat lower but still favorable ($M = 3.73$, $SD = 1.03$), with 59.4% selecting 4 or 5.

When asked to identify their single biggest perceived barrier to a more positive mindset (Figure 9, Table 9), the most commonly cited barrier was laziness or lack of motivation (26.4%), followed by 20.9% who reported no major barrier (“I feel fairly positive already”). Past experiences or trauma (18.7%) and not knowing how to change (15.4%) were also frequently cited; only 5.5% endorsed the more fatalistic belief that change was not possible for them.

Fig 9. Self-identified biggest barrier to a more positive mindset (N = 91)**Table 9. Self-identified biggest barrier to a more positive mindset (N = 91)**

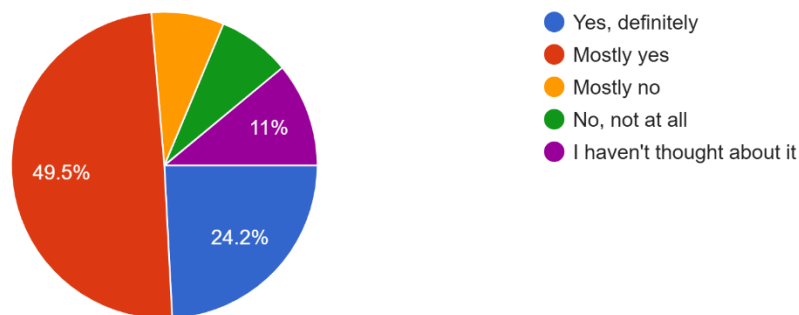
Response category	N	%
Laziness or lack of motivation	24	26.4
Nothing — I feel fairly positive already	19	20.9
Past experiences or trauma	17	18.7
I don't know how to change	14	15.4
My environment or home situation	12	13.2
I don't believe change is possible for me	5	5.5

Regarding the basis of everyday decisions (Figure 10, Table 10), values and beliefs were the most commonly cited driver (24.2%), followed closely by in-the-moment affect (20.9%) and fear of making the wrong choice (19.8%); long-term goals were cited least often among the structured options (14.3%).

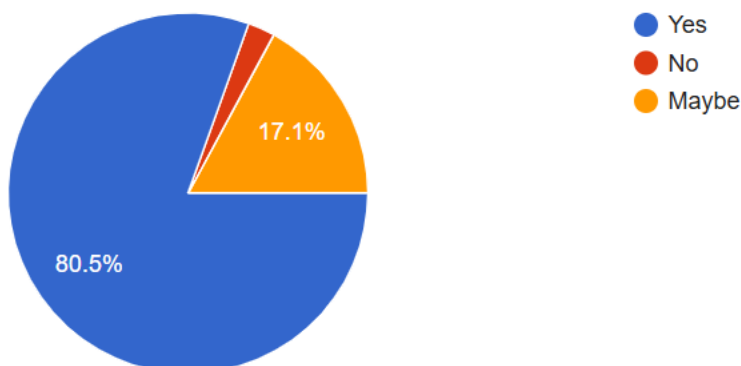
Fig 10. Self-reported primary driver of everyday decisions (N = 91)**Table 10. Self-reported primary driver of everyday decisions (N = 91)**

Response category	N	%
My values and beliefs	22	24.2
What feels good in the moment	19	20.9
Fear of making the wrong choice	18	19.8
What others expect of me	14	15.4
My long-term goals	13	14.3
I don't think much before deciding	5	5.5

Most participants reported that their current life was at least mostly aligned with their personal values and goals (Mostly yes: 49.5%; Yes, definitely: 24.2%), while 15.4% reported misalignment (Mostly no or No, not at all) and 11.0% reported not having previously considered the question.

Fig 11. Belief that choice of today build the life they actually want (N = 91)

Finally, on the two closed-ended items capturing direct readiness for neuroplasticity-informed change (Figure 12 & 13, Table 12 & 13), a strong majority of respondents indicated readiness to pursue cognitive change through neuroplasticity-informed practice (80.5% Yes, 17.1% Maybe, 2.4% No) and reported understanding the link between thought patterns and mental/physical health (78% Yes, 19.5% Maybe, 2.5% No).

Fig 12. Readiness to pursue cognitive change through neuroplasticity-informed practice (N=91)**Table 12. Readiness to pursue cognitive change through neuroplasticity-informed practice (N = 91)**

Response category	n	%
Ready to pursue change through neuroplasticity:		
Yes	73	80.5
Maybe	16	17.1
No	2	2.4

Fig. 13. Readiness for neuroplasticity-informed change and understanding of the thought–health link (N = 91)

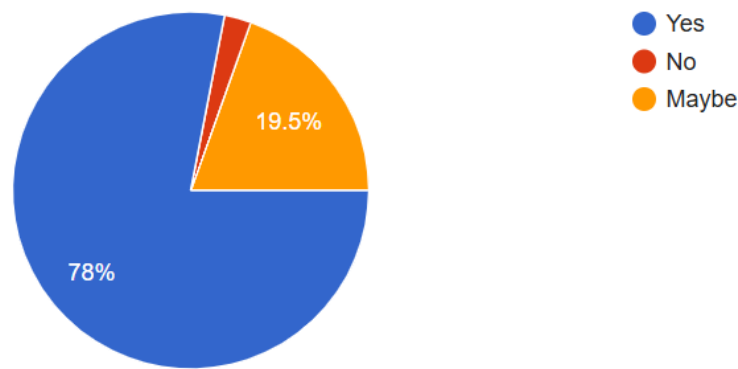


Table 13. Readiness for neuroplasticity-informed change and understanding of the thought–health link (N = 91)

Response category	n	%
Understands link between thoughts and health:		
Yes	71	78
Maybe	18	19.5
No	2	2.5

3.3 Thematic Analysis of Open-Ended Responses

Three open-ended items were thematically coded: (a) a recurring negative self-belief or thought, (b) a single mental habit participants would commit to changing, and (c) participants' description of their “better self” and belief in its attainability. Across all three items, a small number of responses (4–6 per item, 4.4%–6.6%) were non-substantive (e.g., single characters or test entries such as “..”) and were excluded from analytic denominators; these are reported as a data-quality indicator rather than treated as missing-at-random.

3.3.1 Recurring Negative Self-Beliefs

Of 85 substantive responses, 24 (28.2%) explicitly reported no recurring negative belief (e.g., “no,” “nothing”). Among the remaining 61 responses describing a specific recurring negative belief, the most common theme was perceived inadequacy or “not being good enough” (20.0% of the 85-response analytic base), exemplified by statements describing persistent self-doubt about one's competence, intelligence, or worth despite evidence of success. Anxiety-related themes not centered on self-worth (e.g., excessive worry about external circumstances such as finances or family safety) accounted for 9.4% of responses. Smaller but consistent clusters of responses described performance anxiety and self-consciousness in social or evaluative situations (7.1%), self-doubt about achieving long-held goals (7.1%), difficulty with emotional regulation, particularly anger (5.9%), dwelling on past mistakes or regret (4.7%), and relationship- or trust-related concerns (4.7%). Procrastination or perceived laziness was framed as a recurring negative self-belief by 7.1% of respondents, suggesting that for some participants, a behavioral pattern rather than a purely cognitive/affective belief was the most salient recurring negative self-narrative. Table 15 summarizes these themes.

Table 15. Themes in recurring negative self-beliefs (n = 85 substantive responses; multi-coded)

Theme	N	%
No recurring negative belief reported	24	28.2
Perceived inadequacy / “not good enough”	17	20.0
Worry/anxiety (not centered on self-worth)	8	9.4
Other / idiosyncratic content	7	8.2
Performance anxiety / self-consciousness	6	7.1
Procrastination / perceived laziness	6	7.1
Self-doubt about achieving long-held goals	6	7.1
Difficulty with emotional regulation	5	5.9
Dwelling on past mistakes / regret	4	4.7
Relationship / trust-related concerns	4	4.7

Theme	N	%
Self-blame / internal attribution for negative events	1	1.2
Concern with others' perceptions of self	1	1.2
Comparison with others	1	1.2

3.3.2 Self-Nominated Mental Habit to Change

Of 86 substantive responses describing a single mental habit participants would commit to changing, the most frequently nominated target was reducing social comparison (19.8%), with responses overwhelmingly phrased as a direct behavioral commitment (e.g., “stop comparing myself to others”) rather than as a vague aspiration. The second most common target was reducing rumination or overthinking broadly (14.0%), followed by two related but distinct self-regulatory targets: increasing metacognitive awareness of one's own thought patterns (10.5%, e.g., noticing and pausing on self-critical thoughts before responding to them) and building general self-belief or confidence (10.5%). Cultivating positivity or self-encouragement directly was nominated by 9.3% of respondents. A small number of participants (7.0%) explicitly reported no specific habit they wished to change. Notably, the most frequently nominated theme (reducing social comparison) maps closely onto a well-established correlate of lower wellbeing and self-esteem in social comparison research, suggesting this may be a particularly salient and actionable target for future intervention design in this population. Table 16 summarizes these themes.

Table 16. Themes in self-nominated mental habit to change (n = 86 substantive responses; multi-coded)

Theme	N	%
Reducing social comparison	17	19.8
Reducing rumination / overthinking	12	14.0
Building self-belief / confidence	9	10.5
Increasing metacognitive awareness	9	10.5
Cultivating positivity / self-encouragement	8	9.3

Theme	N	%
No specific habit reported	6	7.0
Self-compassion / progress over perfection	4	4.7
Reducing worry / anxiety	4	4.7
Reducing procrastination	4	4.7
Reducing concern for others' opinions	4	4.7
Mindfulness / present-moment focus	3	3.5
Cultivating gratitude / celebrating progress	3	3.5
Self-acceptance (no change desired)	3	3.5
Building discipline / consistency	2	2.3
Relationship-focused change	1	1.2
Self-blame reduction	1	1.2

3.3.3 Vision of a “Better Self”

Of 87 substantive responses describing participants' vision of a “better version” of themselves, just over a third (34.5%) gave an affirmative response without elaborating on the specific content of that vision (e.g., a brief “yes” or “yes, I can”). Among responses that did elaborate, confidence or self-assurance was the most prominent recurring content (16.1%), followed by descriptions of incremental, process-oriented self-improvement rather than a fixed end-state (11.5%; e.g., “better than I was yesterday,” “one small step at a time”). Smaller clusters described authenticity and emotional steadiness (6.9%), achievement or success orientation (6.9%), and holistic combinations of character traits such as confidence, discipline, kindness, and emotional strength (5.7%). A small minority of responses (4.6%) expressed explicit doubt that this better version of themselves was attainable, while 2.3% indicated they were already largely satisfied with who they currently were. Table 17 summarizes these themes.

Table 17. Themes in participants' vision of a “better self” (n = 87 substantive responses; multi-coded)

Theme	n	%
Affirmation only, no elaborated content	30	34.5
Confidence / self-assurance	14	16.1
Incremental, process-oriented self-improvement	10	11.5
Authenticity / emotional steadiness	6	6.9
Achievement / success orientation	6	6.9
Holistic character traits (confidence, discipline, kindness, strength)	5	5.7
Explicit doubt about attainability	4	4.6
Already satisfied / minimal change desired	2	2.3
Emotional steadiness / energy	2	2.3
Reducing social comparison	2	2.3
Other distinct themes (each n = 1)	5	5.7

Taken together, the qualitative data add texture that the closed-ended findings cannot provide. Most participants expressed growth-oriented, affirmative views of their own capacity for change. But those views were often general rather than specific — “I want to be better” without a clear sense of what that means or how to get there. And across all three open-ended items, a consistent minority reported either no desire to change or active doubt about whether change was possible. That minority does not show up clearly in the summary statistics, but it is there.

4. Discussion

The study examined undergraduate women’s self-reported thought patterns, metacognitive awareness, and openness to cognitive change immediately after administering a psychoeducational session on

neuroplasticity. Three key findings emerged, each carrying both theoretical significance and practical implications.

The first finding throws light on how negative and repetitive thought patterns were not just common but dominant. When participants were enquired about the type of thoughts that occupied their minds the most, it was worrying about the future and replaying past mistakes than self-encouragement or gratitude. More than a third reported getting stuck in repetitive thought loops often or always. Moreover in the open-ended data, the most frequently named recurring negative belief was a straightforward sense of not being good enough — not a situational worry, but a persistent, global self-evaluation. None of this is entirely surprising given what the literature already tells us about repetitive negative thinking in university students. Elevated RNT is well documented in this population and is consistently associated with lower self-esteem, higher burnout, and poorer emotional wellbeing (Ehring & Watkins, 2008; Inostroza et al., 2024; Brueckmann et al., 2025). What the current data add is a granular, first-person picture of how these patterns are experienced and described by one specific group — young women, in a non-Western setting, at the moment they are being introduced to a framework for addressing them.

The second finding sits in apparent tension with the first: the same participants who reported significant ruminative and self-critical thinking also expressed strong willingness to change. Willingness to work on one's thinking was the highest-rated Likert item in the survey. Nearly three-quarters said they were ready to pursue change through neuroplasticity-informed practice. That is a notable level of stated openness. It fits conceptually with a growth-oriented or incremental view of psychological traits — the kind of view that research on implicit theories of intelligence suggests is linked to more adaptive responses to difficulty and setbacks (Dweck & Leggett, 1988; Yeager & Dweck, 2020). Whether the session itself produced that openness, or whether it was already there and the session simply activated it, cannot be determined from this design. That distinction matters and is a key reason why a controlled pre-post design is the obvious next step. It is also worth noting that growth mindset effects are considerably more variable across individuals and contexts than early research implied (Yeager & Dweck, 2020), so the parallel is offered as an interpretive frame, not a mechanism.

The third finding is perhaps the most actionable. Of all the mental habits participants said they wanted to change, reducing social comparison came up most often — ahead of reducing rumination, building confidence, or becoming more metacognitively aware. This was not a vague aspiration. Responses were typically phrased as direct commitments: stop comparing myself to others. Social comparison is already well understood as a driver of lower self-esteem and emotional distress in young women, and it is particularly salient in contexts where social media use is high. The fact that this population named it unprompted as their primary target suggests it may be more amenable to intervention design that is explicitly framed around comparison — using self-referenced rather than other-referenced progress tracking, for instance — rather than around positive thinking in the abstract. Interventions built around what a specific population identifies

as their own priority tend to have higher face validity and uptake (Rezapour et al., 2025), and this finding offers a clear, empirically grounded direction for future program design.

There is also a methodological observation worth making here. On the closed-ended readiness item, 72.5% of participants said yes, they were ready for change. But the open-ended responses told a more complicated story: a third of “better self” visions were affirmations without any content, and a meaningful minority across all three open-ended items either denied any desire to change or expressed genuine doubt about their ability to do so. These participants were largely invisible in the summary statistics. This is not a trivial point. If readiness for change is assessed only through binary or Likert items, it will tend to look higher — and more homogeneous — than it actually is. Mixed methods design of the kind used here are particularly well placed to surface this kind of within-sample variation, and psychoeducation research in particular would benefit from routinely including them (Braun & Clarke, 2006).

One more clarification is warranted about the session content itself. The psychoeducational session was grounded in established neuroscientific ideas — primarily Hebb’s (1949) principle of activity-dependent synaptic strengthening, as reviewed in more recent work by Kandel (2001). This study does not evaluate, and should not be read as validating, any more specific claims that may also have been part of the session’s delivery — particular timeframes for habit formation, for instance, which circulate widely in popular neuroplasticity content but are not supported by peer-reviewed evidence. The findings here speak only to what participants reported about their thinking and their readiness to change, following exposure to the general neuroplasticity premise.

Limitations

Several limitations bear directly on what can and cannot be concluded here.

Most fundamentally, this is a cross-sectional study with a single measurement point and no comparison group. We cannot say whether the session changed anything, or whether the readiness participants expressed reflects a genuine response to what they just heard, a pre-existing disposition, or simply social desirability in a context that explicitly encouraged optimism about change. All three explanations are plausible, and the design cannot distinguish between them. The findings should be read as a descriptive snapshot, not as evidence of effectiveness.

The sample is also limited in important ways. With 91 participants — all female, all drawn from a single institution, all between 19 and 21 years old — there is a real ceiling on how far these findings can travel. We cannot say how the picture would look in mixed-gender samples, older students, postgraduate populations, or students encountering this kind of content through a different format (a course rather than a one-off session, or a digital tool rather than an in-person talk).

All measures were self-report, which introduces its own set of risks. Participants responding to a survey immediately after an upbeat session on self-improvement may have been motivated to present themselves as more open to change than they would in a more neutral context. This is a known problem in psychoeducation research and is not easily resolved without unobtrusive or behavioral outcomes. Relatedly, several categorical items forced participants to pick a single best-fitting answer from a fixed list, which inevitably flattens complexity; the open-ended items were included partly to compensate for this, and they did add nuance, but a bespoke questionnaire is still a constrained instrument.

The questionnaire was not a validated psychometric scale. This is a meaningful limitation when it comes to situating these findings within the existing literature. Established instruments for measuring rumination (the Ruminative Responses Scale), worry (the Penn State Worry Questionnaire), or mindset (Dweck's Implicit Theories of Intelligence Scale) would have allowed direct comparison with prior work and more meaningful effect size estimation. Future studies should incorporate at least one validated measure alongside any bespoke items.

The thematic coding was carried out by a single researcher. Without a second coder, we cannot calculate inter-rater reliability, and some degree of interpretive judgment — particularly for responses that touched on more than one theme — is unavoidable. Any replication of this work should build in at least two independent coders and report Cohen's kappa or an equivalent agreement statistic.

6. Implications for Future Research

The most direct next step is a controlled pre–post study. Adding a baseline measure and a waitlist or active comparison condition would make it possible to test whether session exposure genuinely shifts self-reported thought patterns or readiness for change, rather than merely capturing what students say in the immediate post-session glow. Incorporating validated measures of rumination, worry, mindset, and self-esteem would anchor the findings within the broader literature and generate the effect size estimates needed to power subsequent trials properly.

The finding that reducing social comparison was the most frequently self-nominated change target is worth building on directly. An intervention that explicitly operationalizes neuroplasticity principles in the context of social comparison — framing progress in self-referenced rather than other-referenced terms, for instance — would test whether naming a population's own priority as the frame for change improves uptake and engagement relative to generic positive thinking content.

Finally, follow-up measurements at two weeks and eight weeks would address the question that this study cannot: whether the openness to change reported immediately after the session translates into anything durable. That is ultimately the question the whole intervention literature is working toward, and it cannot be answered without longitudinal data.

7. Conclusion

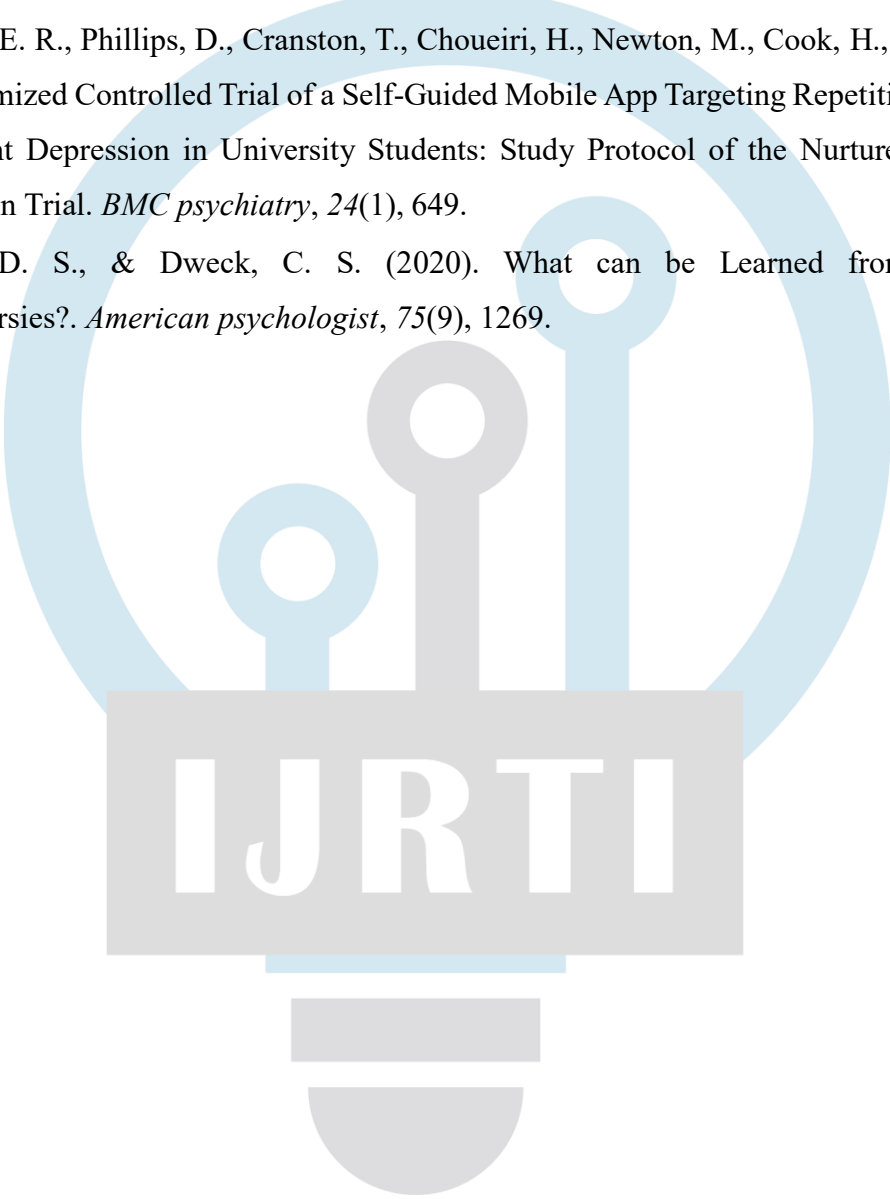
Ruminative, self-critical thinking was common in this sample of 91 undergraduate women. Worry about the future and replaying past mistakes dominated the mental landscape more than self-encouragement or gratitude. Feeling not good enough was the most frequently named recurring negative belief. And yet these same participants said, in large numbers, that they were willing and ready to work on changing their thinking. The most concrete thing they wanted to change was social comparison.

What this tells us is that a single psychoeducational session on neuroplasticity appears to be a feasible and acceptable starting point for this population — one that meets an existing interest in self-improvement and puts a biological rationale behind it. Whether it does more than that — whether it changes how people actually think over time — remains genuinely unknown. Answering that question requires controlled, longitudinal research with validated measures, which can serve as a recommendation for further study.

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