# Survey results for mental health care professionals' attitudes toward neuroscience and its integration in clinical interventions: Supplement

## Table of Contents

**List of questions**

Note: All potential answers for each question are provided in the results in the following pages (or in the article figure)

1. Rate your knowledge of neuroscience
2. Check all the types of exposure to neuroscience that you have had
3. What specific topic(s) within neuroscience do you choose to share with your clients/patients? Check all that apply
4. Have you observed any specific benefits to providing neuroscience literature or data to clients/patients? If so, check all that apply
5. What are barriers to communicating neuroscience to your clients/patients? Check all that apply
6. What types or levels of evidence would be sufficient for you to integrate neuroscience findings into your clinical diagnosis, treatment and/or assessment of therapeutic change? Check all that apply for treatments
7. What types or levels of evidence would be sufficient for you to integrate neuroscience findings into your clinical diagnosis, treatment and/or assessment of therapeutic change? Check all that apply for assessments
8. How much does neuroscience align with your identity as a mental health clinician?
9. Do you think that neuroscience is outside the scope of mental health practice?
10. What therapeutic change mechanisms and processes do you think need to be studied?
11. Does including a biological rationale for a particular treatment or diagnosis decrease stigma in your clients/patients? *
12. Additional comments or questions (optional)

*The initial survey had the wording “decrease or increase stigma.” This was recognized and corrected to “decrease stigma” shortly after administration. The few responses that were collected prior to change were recoded (using participant text responses) to reflect the correct question.

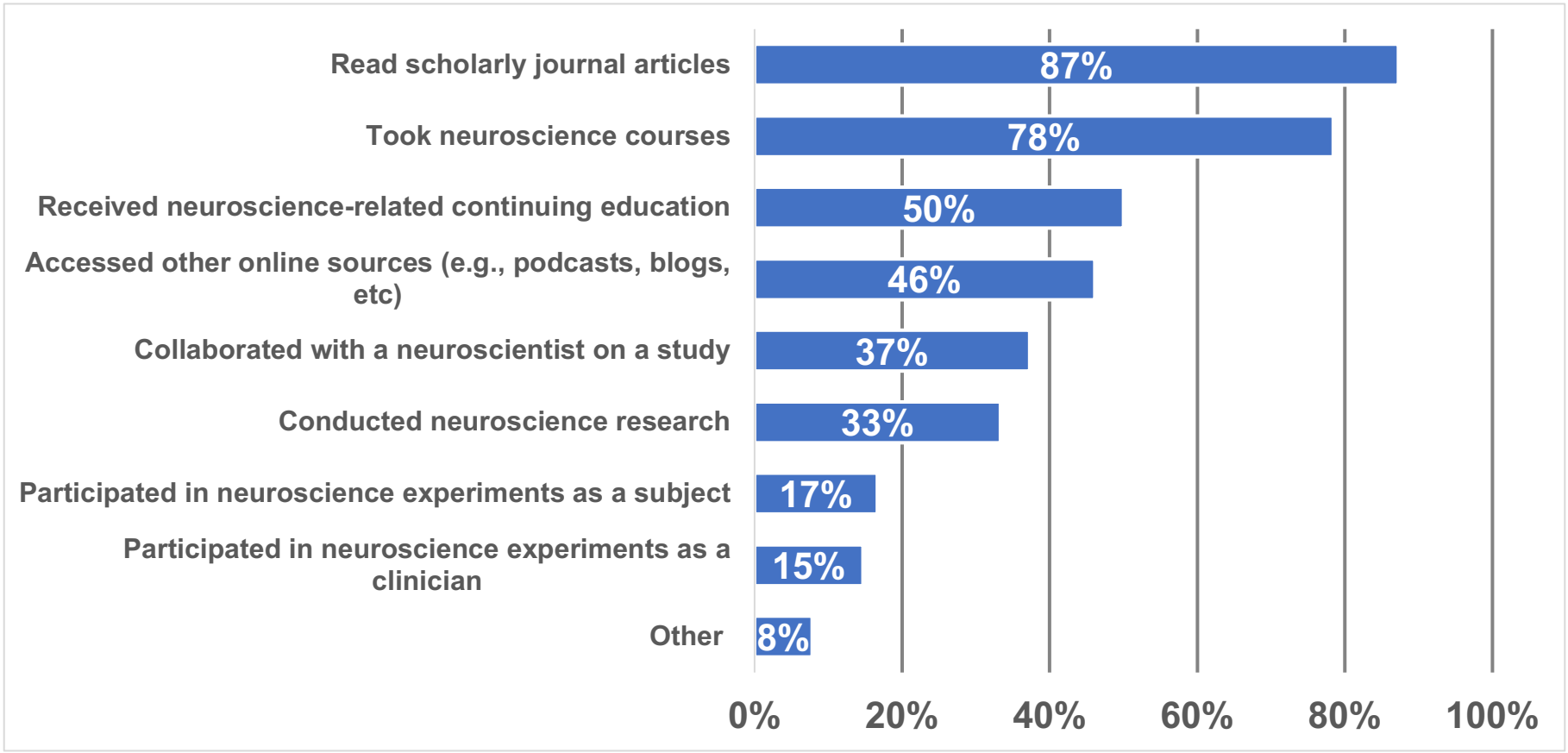
**Demographics of sample (N=109)**

| | |
|---|---|
| Gender | 64.8% Female<br>34.3% Male<br>0.9% Agender/Genderqueer |
| Age | M=43.77 (SD=13.81) |
| Race | 88.2% White<br>7.8% Asian (Japanese, Chinese, Korean, Indian, Other)<br>2.0% Black / African American<br>2.0% Middle Eastern / North African |
| Professional identification* | 66.7% Clinical psychologist<br>24.8% Clinical researcher<br>11.4% Psychotherapist<br>4.8% Public health research / policy<br>4.8% Neuroscientist<br>4.8% Other researcher / other<br>2.9% Counselor<br>1.9% Social worker |
| | 33.3% Faculty<br>9.5% Postdoc<br>17.1% Graduate student |

Note. % refers to valid percent. *Sum of percentages do not equal 100; participants varied in the number of professional identifications they endorsed.

**Neuroscience familiarity and identity**

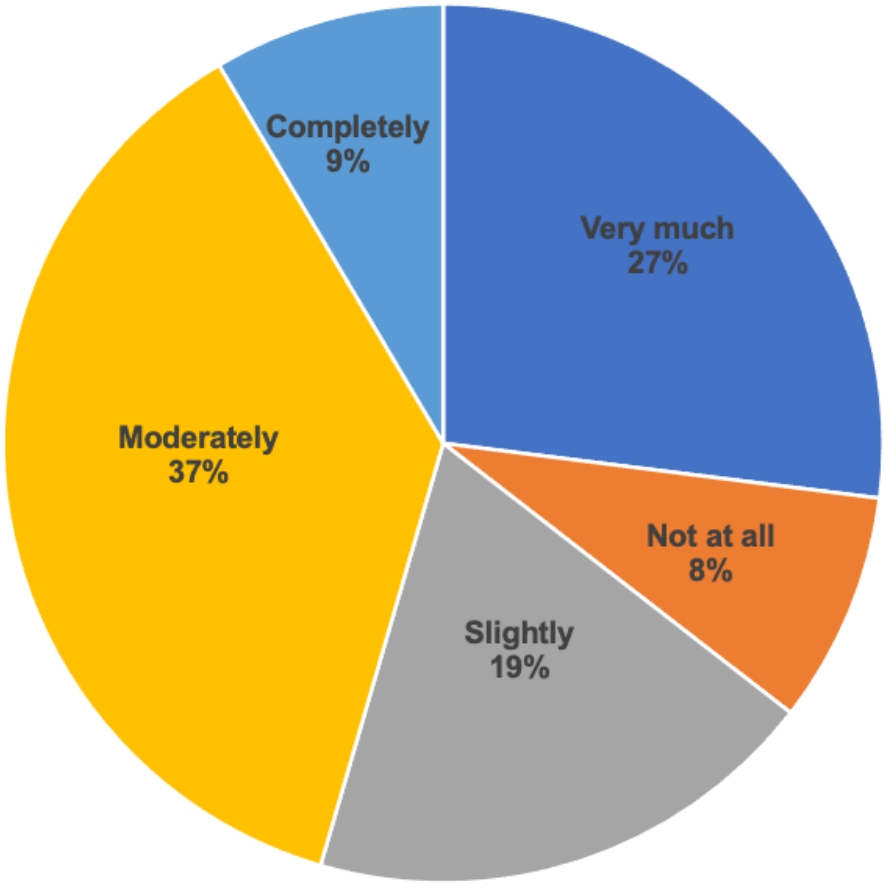
Prior exposure to neuroscience




Other means of exposure text entry:

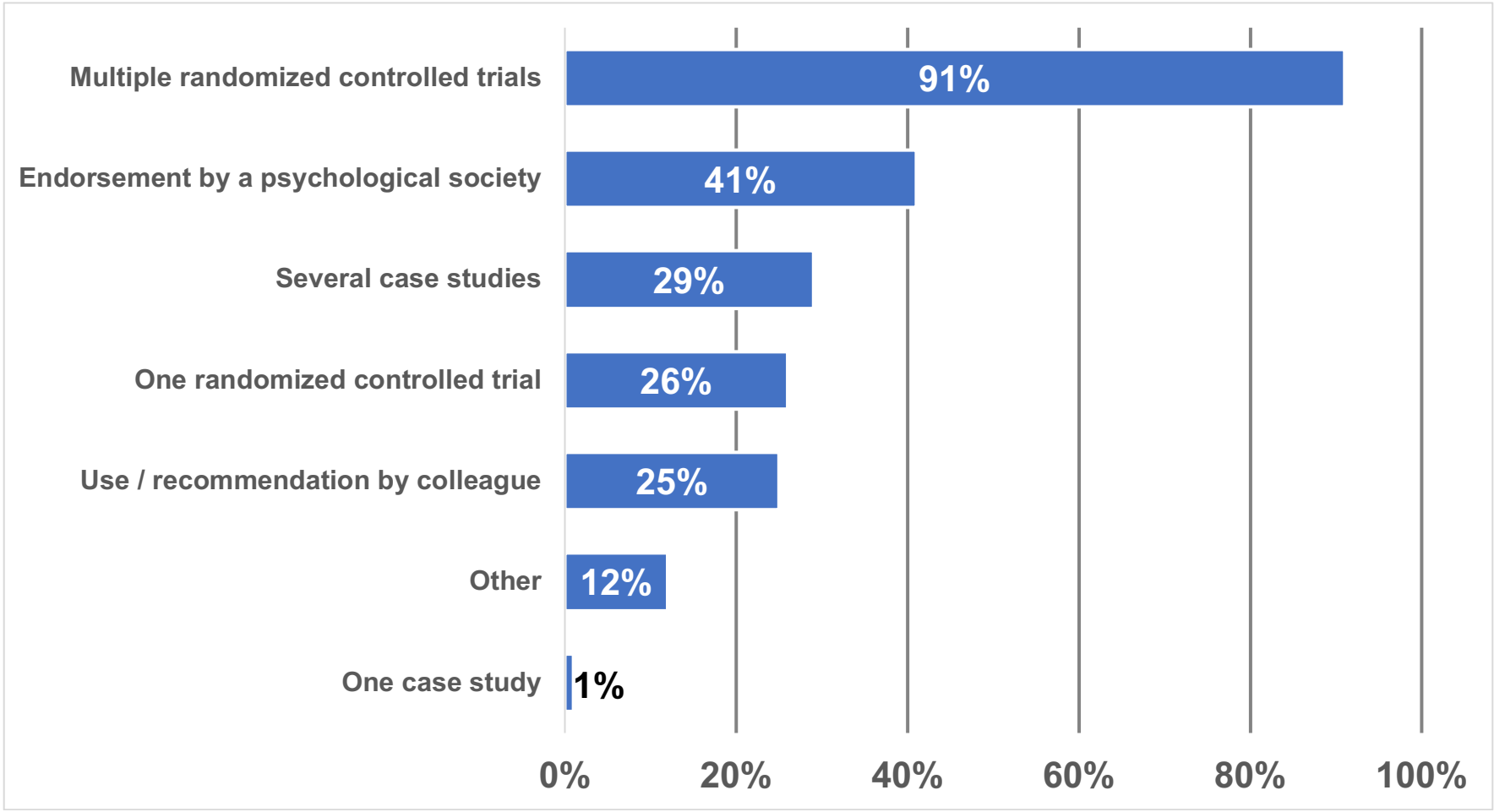
- Clinical neuropsychology assessment training
- Books
- Print media
- I was in a neuroscience-focused K12 program to begin my faculty position
- assisted with neuroscience research as a research assistant
- Research assistant in neuroscience research
- Worked with 1000s of IDD people

How much neuroscience aligns with identity as a clinician



**Clinical translation**

Evidence that would be sufficient for integrating neuroscience findings into clinical practice (treatment)

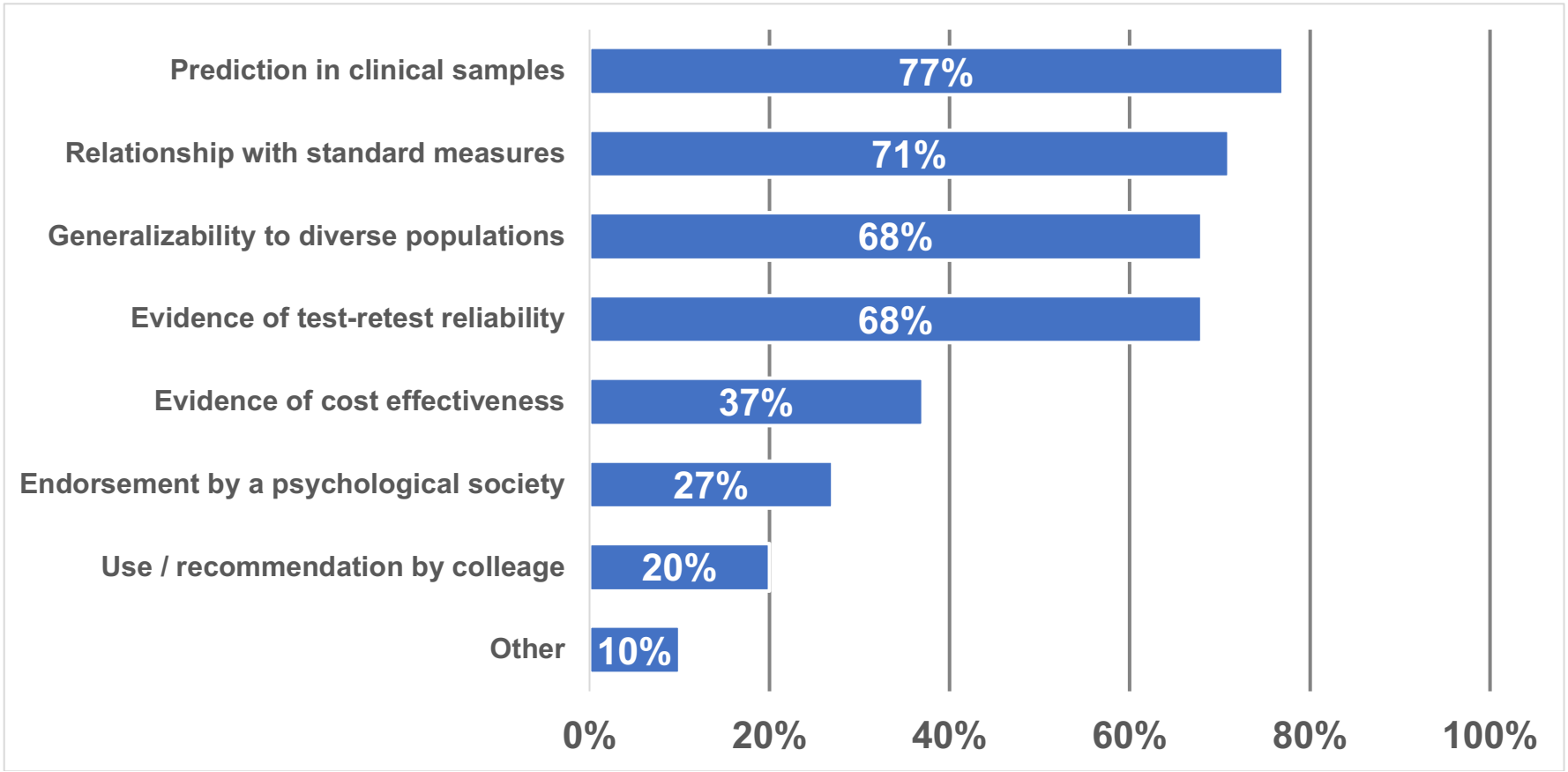


Sufficient evidence for integration (treatment) continued

Other evidence text entry:

- Depends on the manner of the information: single subject provides one type of information, RCTs a very different type, and this then would have to fit to what the client is working on
- FDA approval for neuroscience-based device interventions (e.g., TMS)
- Depending on client and relationship with client, may be open to discussing findings from case studies with them, and just really framing the evidence in that way: this is where I'm getting this from, this is how confident experts on this seem to be...
- Information, case studies, or RCTs specific to sharing neuroscience findings that demonstrate it adds benefit beyond any cogent rationale for treatment based in learning theory.
- Evidence that findings hold in real world environments (effectiveness - not just efficacy). Longer term follow-ups would be helpful.
- More research bridging neuroscientific findings and how they can be specifically applied in interventions, therapeutic principles, especially longitudinally
- I would always explain the source of information to patients so if it's one case study I would explain what that means and to take the findings with caution.
- Other types of research
- Evidence that converges across multiple studies and methods
- I would want to see RCTs no matter what, but I would like case studies to see more detail of HOW neuroscience was integrated, how it was perceived, how challenges were addressed, etc.

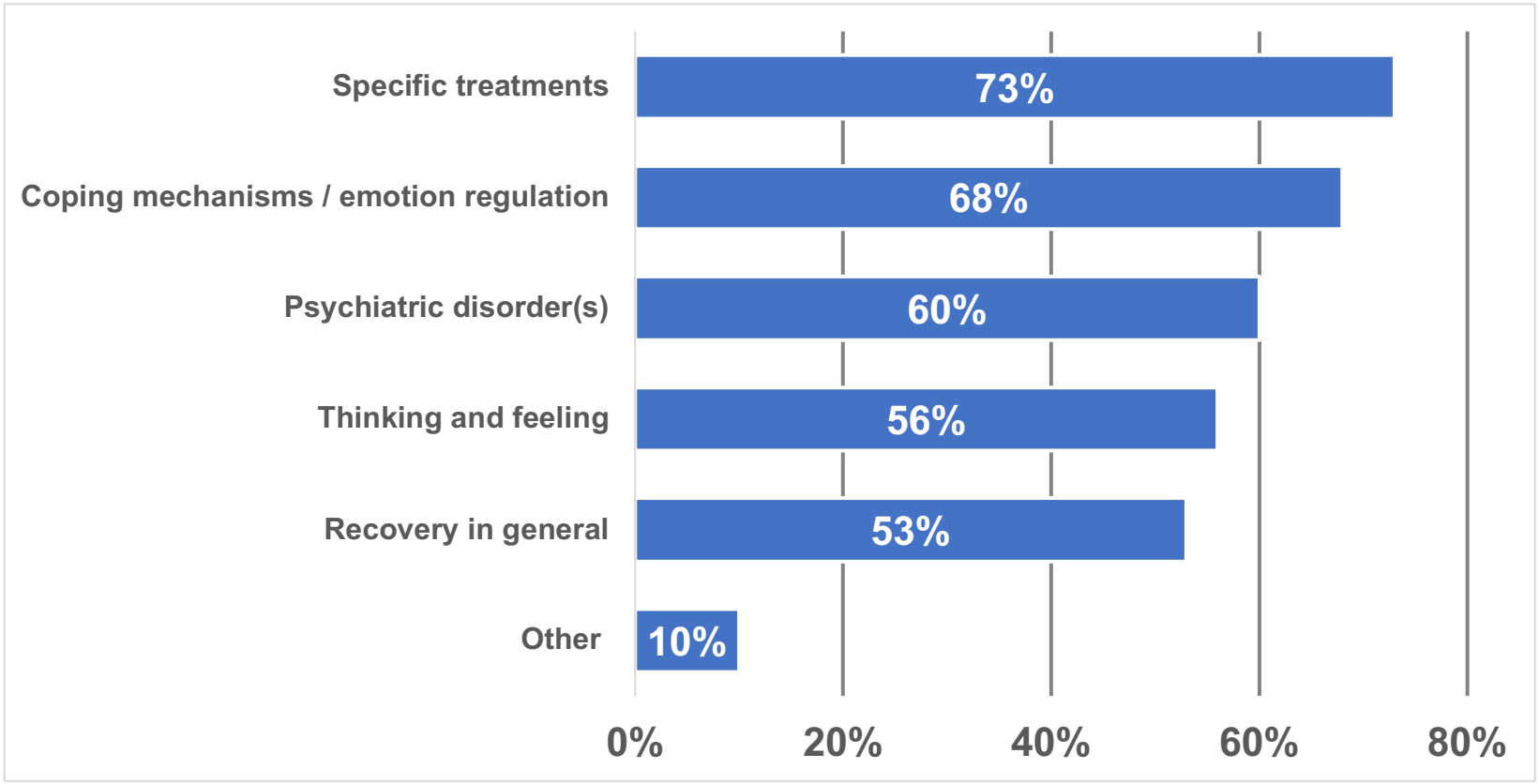
Evidence that would be sufficient for integrating neuroscience findings into clinical practice (assessment)




Other evidence text entry:

- Predictive validity
- Any good reasons to think it would be helpful beyond what is already done that works well
- Easy to use, no equipment
- Reduced costs for neuroscience measures; more specific relationships for diagnosis
- Availability of relevant technologies. Norms. Standards for administration.
- Incremental validity
- More research bridging neuroscientific findings and how they can be specifically applied in interventions, therapeutic principles, especially longitudinally

Therapeutic change mechanisms and processes that neuroscientists need to study



Therapeutic change mechanisms and processes that neuroscientists need to study continued

Other topics text entry:

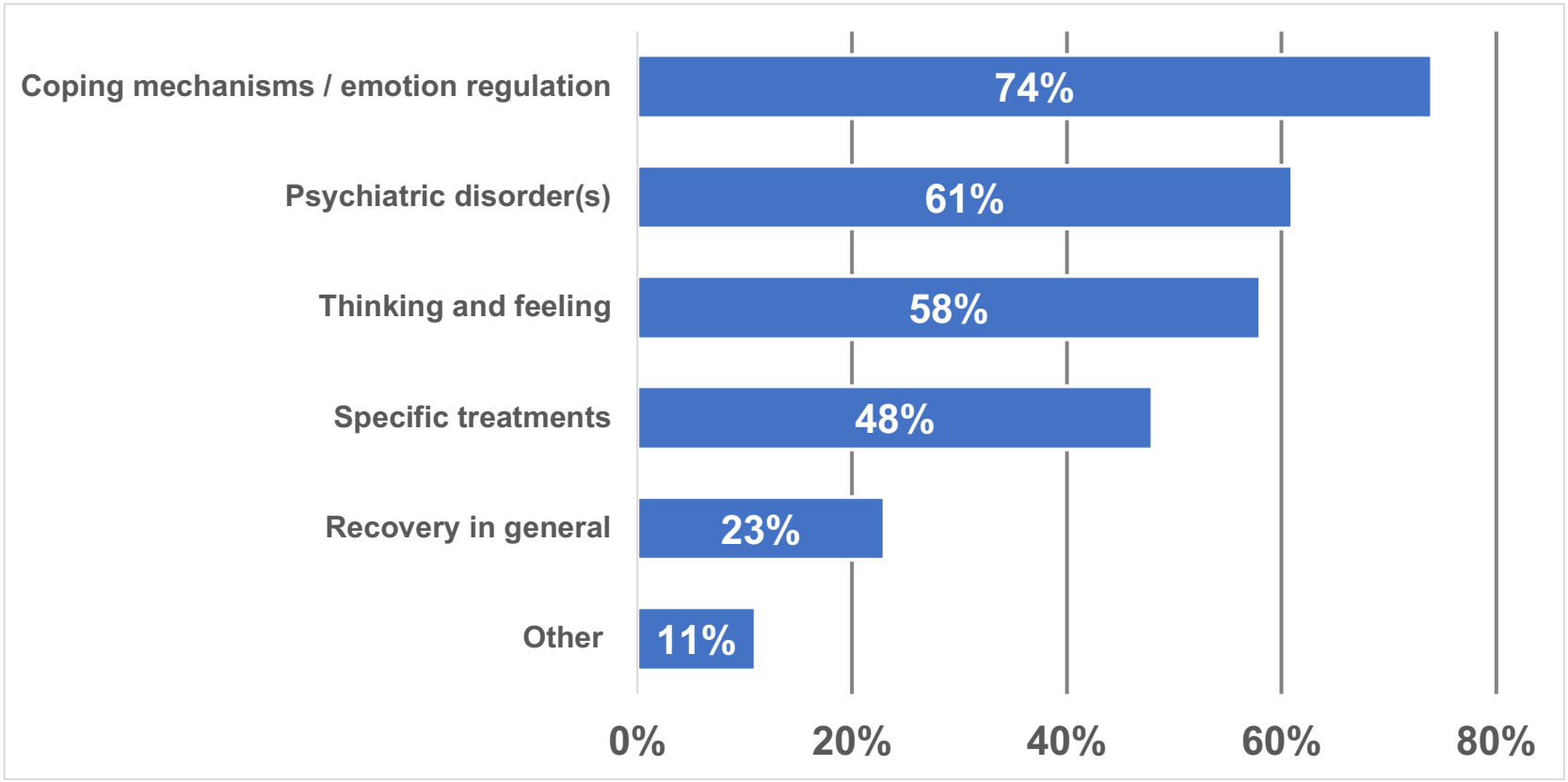
- How social determinants impact neural processes
- Neural mechanisms that block recovery.
- Neural mechanisms that differentially predict treatment response.
- Neural processes the persist when people do not recover.
- Neural processes of mindfulness and self-compassion (which of course are already studied)
- Neural processing pre/post treatment interventions
- All of the above! And they need to be studied in diverse populations (gender diversity, racial/ethnic diversity, etc.)
- I would generally not recommend we continue to over-fund neuroscience research, at the expense of under-funding psychosocial/behavioral intervention research
- All the other stuff the brain, gut, nervous system, hormones, etc. do as well
- None, I think we need to focus on dissemination of existing treatments and services research for underserved populations

Additional comments regarding neuroscience integration and topics to be studied:

- Despite selecting the above, I feel ambivalent about the extent to which this information will actually be helfpul to patients
- I do not think there are psychiatric disorder specific neural processes, there is so much overlap between treatments that it would be surprising to find treatment specific neural processes
- While all are interesting, I'm skeptical about the fetishization of observable changes through a neural lens rather than observed behavior.
- Who cares? The point is for our treatments to help people have better lives that they want to live. How does knowing the neural processes help that if it does not change the treatment approaches?
- More research does not hurt, so most of these have value.
- They are all interesting from a scientific standpoint, but please see my previous comments regarding how I believe this relates to CBT professionals.

**Communicating neuroscience to patients**

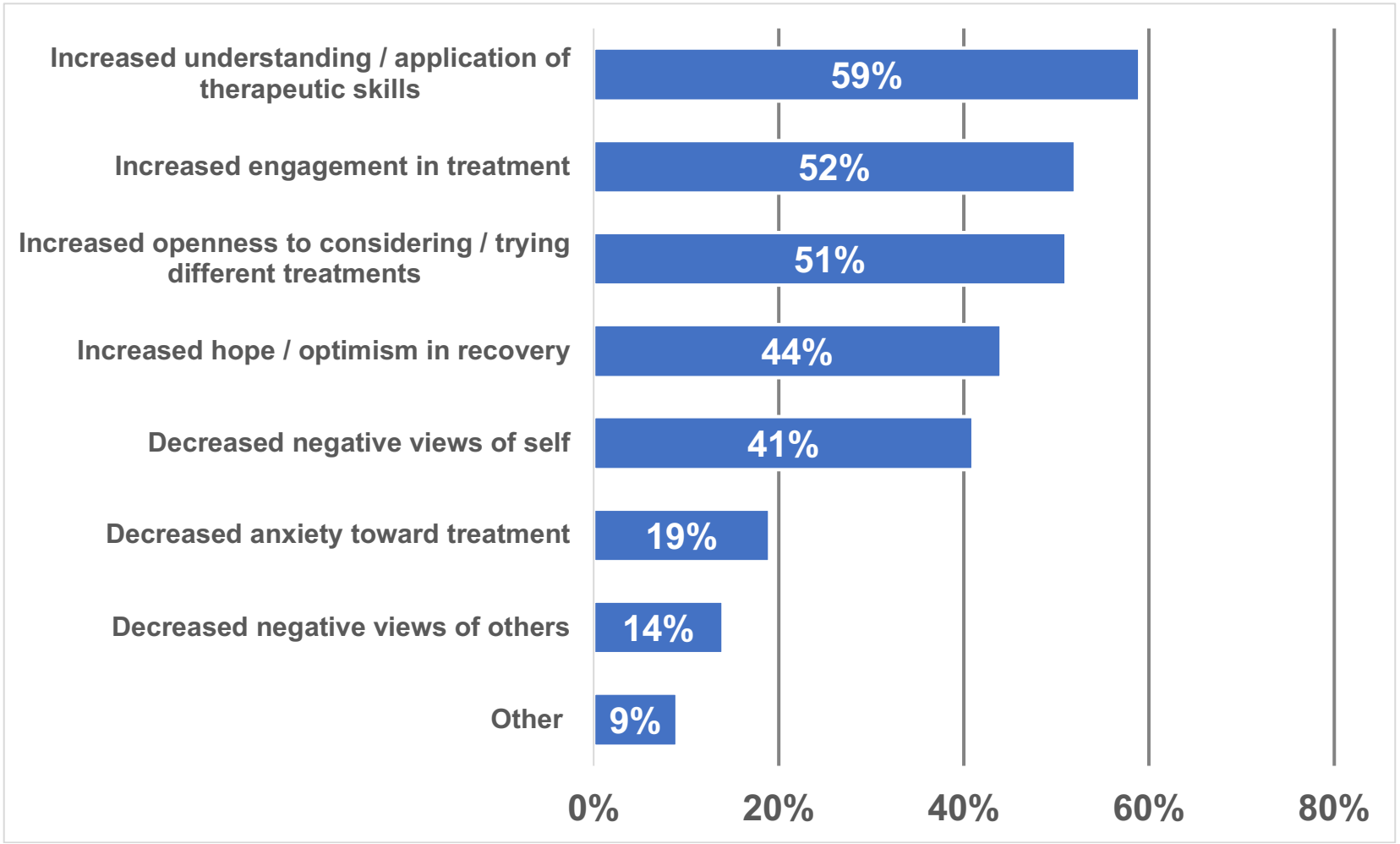
Neuroscience topics previously shared with patients




Other text entry:

- ANS involvement in chronic pain
- Trauma
- Neurocognitive development
- Neural processes related to predisposition and exposure
- The interventions/client work I have had training in have not yet included an opportunity/wiggle room to discuss the above. But, in feedback sessions for autism evaluations, we sometimes do get to speak about/more like lightly mention some neuroscience findings
- Neural processes of mindfulness and self-compassion
- Brain Evolution for Threat Detection

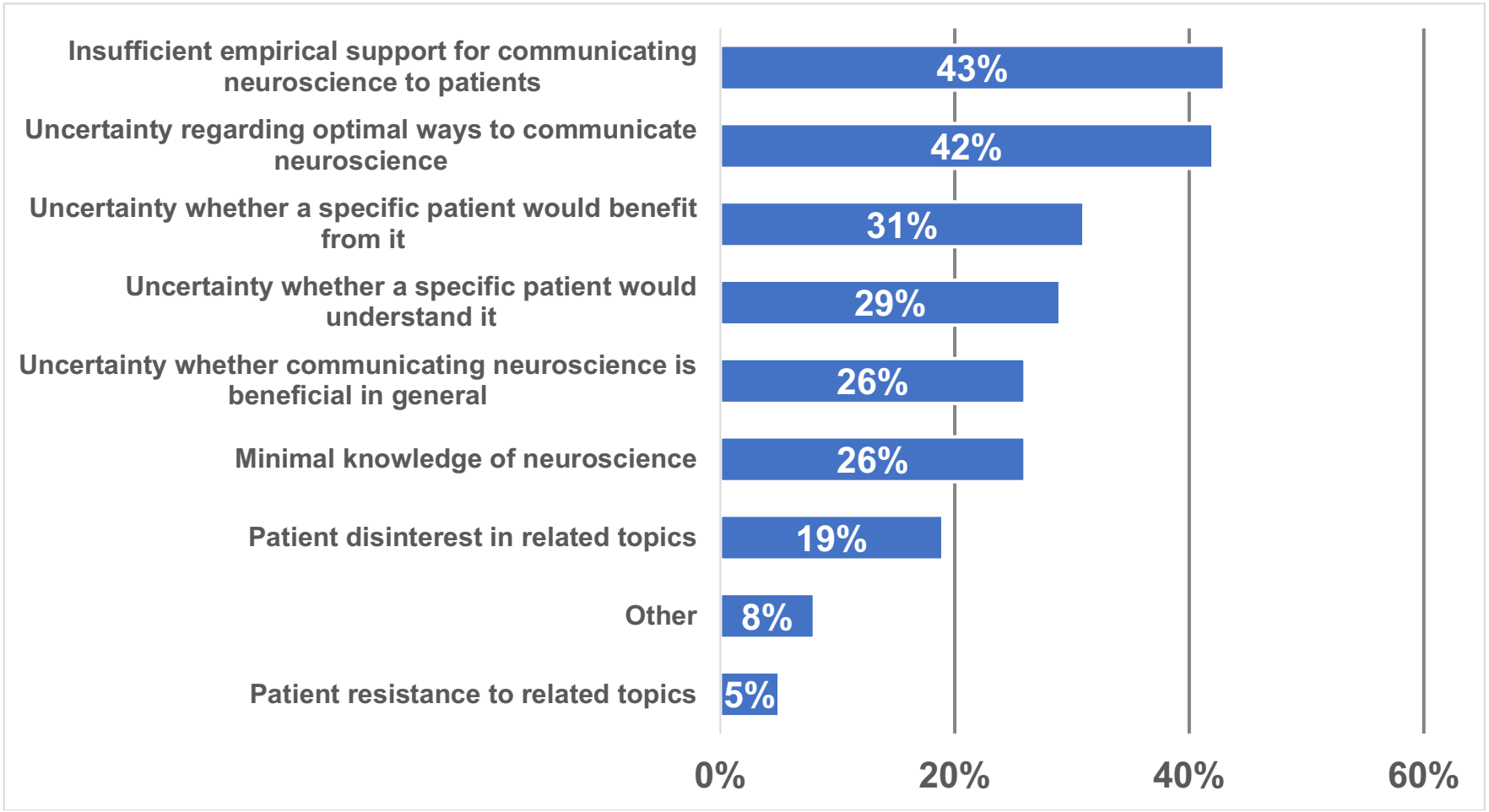
Observed benefits of providing neuroscience information to patients




Other text entry:

- Feeling less stigma about mental health
- Makes treatment seem more credible (affecting the brain)
- Validating diagnosis and response to triggers (e.g., PTSD)
- Fatalism that they cannot control their biology - assumption of sick role status
- I hope it promotes self-compassion and defusion, but I'm not sure if it does.
- Increased trust in providers / reduced stigma
- Unsure if patients benefited or not ANS involvement in chronic pain

Barriers to communicating neuroscience to patients



Barriers to communicating neuroscience continued

Other barriers text entry:

- I am not interested in neuroscience and it’s hard for me to understand sufficiently
- Not uncertainty. I have no reason at all to think that referring to neuroscience during treatment would be particularly helpful. And I think in general reducing psychological processes to neuroscience specifically misses the point much of the time
- Perceived (not necessarily by me, a trainee) lack of application to a given intervention (i.e., it's not in my training for this intervention, and I would need to incorporate the knowledge on my own + get this approved by a supervisor, who is also not an expert on this information)
- Insufficient empirical support linking basic neuroscience to clinical interventions and mechanisms for therapeutic change
- Don't want to take up session time with academic lectures that the client may not care about; I am trying to be more experiential
- Though I value this I think this takes us away from our subject matter. We don't address clinical phenomena from this level of analysis. This would be more appropriate for a prescriber or therapist whose treatment approach involves this material. We are CBTers...we should limit our discussion to this level of analysis for many reasons.
- Data from Kemp et al and others suggesting that "broken brain" models of psychopathology INCREASE self-stigma I hope it promotes self-compassion and defusion, but I'm not sure if it does.

**Biological rationale and stigma text responses**

**Text responses for biological rationale reduces stigma**

- It reduces self-blame.
- I work with lots of chronic pain/functional conditions, and discussing the mind-body connection via the ANS can be very helpful for patients' understanding
- helps absolve them of shame/personal responsibility
- maps on to a medical model they can understand and reduces shame/self blame
- It seems to reduce self-blame
- We've published on that, as have others.
- Generally yes, clients report it being "different from me and less of my fault."
- Makes mental health problems more like physical problems/diseases
- Clients view less as a personal weakness or failure
- If it's about the brain people don't think it's their fault as much (see Deacon's work)
- For some
- Yes – then it’s not a moral failing/weakness, it’s an illness like any other
- It reduces ambiguity and provides patients with a clearer rationale for why they are experiencing the symptoms they are experiencing, and also provides a rationale for how and why the treatments I often use (for example, Prolonged Exposure therpay for PTSD) are likely to work effectively
- reduces blame, can provide explanation about ethiology, makes it more similar to physical illness
- Yes, definitely for diagnosis. often especially effective for decreasing stigma in family members of clients with disorders that they blamed for having - e.g., eating disorders. I haven't seen as many strong neuroscientific rationales for treatments and would love to see more.
- I hope it normalizes what's happening, decreases self-blame, and increases defusion
- because it becomes less about character and weakness and more about learning skills through habit development. it also reduces the stigma of outbursts, especially males, by addressing the need to treat the FAST circuit
- It decreases a sense of responsibility for causing the disorder (much like other medical disorders such as diabetes). Tends to increase self-compassion and acceptance of the disorder
- Because it shifts my patients from won’t to can’t and allows them skill build
- Decreases stigma - they know it is not something "wrong" with them when there is an identifiable rationale
- Potentially as an explanation for symptoms
- Decrease stigma - medical brain issue not a character flaw
- Discussing mechanisms decreases guilt/shame-based interpretations of diagnoses and symptoms.

**Text responses for biological rationale does not reduce stigma**

- Not necessarily. This is an assumption among White clients. So people of color find the idea of being " brain sick" just as stigmatizating
- The whole depression is like diabetes discussion is old and tired. I think we have learned since the mid 90s that biological answers are not enough.
- I don't know about individual clients but I think in general it is a bad idea to suggest that biological bases should be less stigmatizing than non-biological ones. That's one reason I'm opposed to the idea of looking at sexual orientation as "born this way" vs a choice is a problem. Discrimination isn't okay either way.
- Lisa Diamond has written extensively on how belief in the innateness of sexual orientation has never translated into shifting stigma through the presentation of biological rationales. I see no reason why diagnostic stigma would differ, and sexual orientation stigma literature suggests it's more likely that bias looks for reasons, not reasoning.
- demonstrated in the literature
- It is suggestive of biological cause and, often, this leads to a sense of hopelessness unless it is explained that neural processes can change over time with treatment
- see researched on mixed blessing model

**Text responses for ambivalent / unsure whether biological rationale reduces stigma**

- It is not just about the biological rationale but HOW it is presented to the client.
- I am not sure.  It often works to demotivate patient behavior and often contributes to family accommodations rather than empathy and understanding.
- Unsure. I don’t hold a lot of stigma
- I would be interested to hear what patients, in general, have to say about this. I have heard people make both arguments.
- I would suspect that different thigns function differently for different people.
- For some, yes. For others, it doesn't add anything.
- varies based on presentation/patient characteristics
- It varies. Some are open to it, others attribuyte their distress to external causes
- It depends on the patient. There's definitely data suggesting it increases in some cases. I don't think it's black and white. I would not offer this rationale solely for this purpose.
- I think it depends on the clients presentation, demographics, and views on mental health/stigma
- It seems to bolster understanding on the occasions I’ve used it to help explain my results but the absence of it doesn’t seem to distract from treatment or assessment explanations either
- It varies by client values, by diagnosis, and by type of stigma (self-directed versus external; blame versus perceived dangerousness, agency, hope for recovery etc.)
- Depends on if it has the effect of normalizing their proble/disorder, or it makes them feel that the biol explanation ma doom them or family members to inherited dysfunction
- somtimes yes, and sometimes no.  depends on the client and the issue at hand
- Would be interested to see evidence about this topic

- Depends on patient
- It depends on the framework it is presented in - while we know a lot about the brain, our assumptions about why processes occur or don't occur still frame things as a disease then that can still be stigmatizing; normalizing brain processes can decrease stigma
- I don't think the question is sufficiently nuanced. First, there is substantial evidence that it can increase stigma, particularly from others toward those with mental health problems. Second, although some patients may respond positively to this information, it can also decrease confidence in a behavioral intervention (broken brain beliefs). Third, patients are unique within the population and some may respond more or less favorably. In general though, I am of the belief that is has a negative effect.
- Depends on the client. I think it can be harmful to reinforce the idea that something has to be biologically based to be valid and sometimes it helps individuals
- Differs by pt and by dx.
- Depends on the way it is communicated!
- Sometimes it decreases stigma, sometimes the person attaches to the diagnosis as a label and the biological underpinnings become a reason not to change
- Depends on the patient!
- Really depends on the client.  Can go either way.
- It depends on how the information is presented

**Neuroscience and scope of a mental health clinician text responses**

**Neuroscience is not outside the scope**

- I do not even understand how it could be considered outside the scope of practice.
- It seems fundamental
- I feel it can be helpful particularly with trauma
- All of what we do involves changing behaviour and the brain.
- Depending on training/competence
- The body is a physiological system: of COURSE neuroscience is within the scope of mental health practice
- At some level, it's all in the brain. The brain has evolved as an adaptive system, and psychotherapy/behavioral interventions may be conceptualized as an output/feedback to this system
- It is science,
- intrinsically linked
- Psychological processes targeted by mental health treatments are mediated by brain function
- fundmental area of psychology
- The brain and it's functions are still so much a mystery in mental health. Much of the field of psychiatry is still theoretical. While neuroscience is important, it is not the only path to understanding. It is one of them.
- No. People are integrated beings, and avoiding neuroscience is not seeing the person as a whole.
- We are aware how neuroscience impacts mental health and how we can implement that to better our clinical practice.
- Depends on how it is used. Neuroscience in terms of treatment mechanisms, or attachment based neuroscience studies useful
- Why would neuro and science possibly be outside scope? Premise of question seems silly to me.
- I have found that explaining affective neuroscience and risk has increased buy-in from clients and even helped create a sense of valdiation
- At least a basic understanding is important to explain symptoms & treatment to patients and to evaluate tx interventions.
- Psychology and neuroscience are related fields. Effective treatments have neural markers of efficacy.
- Harder science better explains the softer science
- As long as the therapist has training and credentials to provide information about neural processes and mechanisms
- Neuroscience is a general term for studying neural processes, and neural processes are a critical system in human functioning. You don't need to be a neuroscientist to emphasize the importance of neuroscience in clinical services any more than you need to be a geneticist to emphasize the importance of genetics to patients when providing clinical services.
- All changes in thinking and feeling involve changes in the brain. I see no reason to ignore them.
- No- it’s about how the brain works, and that includes pathological processes
- The brain is responsible for much if not all of symptom process and change!
- No, I think it can help inform why people experience certain things. When I've brought it up in clinical practice, people have seemed to appreciate the information.
- I view anything that is related to thinking/feeling/acting to be relevant to mental health practice.

- Because it can be learned, truly has a powerful impact on interventions
- It's important to understand the neural processes underlying the work that we do
- We've got one body- it's all connected and complicated. The more tools I have in my bag of tricks to help more people, the better. Or if not my bag, someone else's- as long as the evidence is there
- Because we are treating the brain - even though I'm shaping behavior, knowing what's happening to the organ we are working with is very helpful and important!
- Mental health is all about neural health and neuroscience contributes to understanding neural health
- mental health is based on neurological functioning
- Neuroscience IS mental health
- There is a biological level of analysis that is relevant to what we do, though not central. It can inform some aspects of psychological care, but similarly, is not what I need to hang my hat on.
- Science describes reality. How could dosing mental health treatment with reality be inappropriate?
- Increased knowledge base about behavioral neuroscience
- Given that we are working in the field of MENTAL health, it is a problem at there has been historically such a divide between brain science and clinical science/practice.
- There are processes we don't see directly that are affected by clinical practice

**Ambivalent / unsure whether neuroscience is outside the scope**

- I don't but I think it needs to be communicated more simplistically, in a way that's digestible for practitioners and clients alike
- depends on what we consider mental health practice - part of clinical psychology but don't consider it part of counselor education
- I think it can be helpful as psychoeducation in the mental health field, but I think it is outside my personal professional expertise
- As a cBT provider I am not that interested in the blackbox workings to show dependent variables. In as much as neuroscience lends credibility to CBT interventions is the extent to which I care about them. The whole medical field tells our clients already that the problem is in their biology and that they are powerless to do anything about it - I do not want to reinforce that. Neuroscience has become a buzz word of half-baked writings, ideas, with little empirical support for how neuroscience discussion assists patients. Look at Van Der Kolk who writes armchair neuroscience and uses it to justify non-treatments, half-baked treatments, and creates impediments to empirically supported CBT treatments. It's a gong show.
- Unsure at times the utility of this method for assessment. It also feels like an attempt to legitimize psychology/mental health practice, when I believe behavioral and cognitive theories/frameworks are just as legitimate. I'm not sure that this medicalization is the right way to increase buy-in from patients and the general public.
- Don't feel I know the literature much in either direction
- No, but I am very skeptical of a reductionist approach to psychology, and I have concern about potential negative consequences of emphasizing neurological levels such as increasing stigma
- Sort of. I would answer this with both a yes and no. I think it's within our scope and I see its value. On the other hand I don't think this is our primary subject matter and may even undermine what we try to do. For example, if a patient believes their disorders is

biologically based they may undervalue the role therapy plays. No room to unpack this in detail here, but in brief I think this signals that we should primarily be reducing to biology or that it has special status relative to the behavioral level. I think both levels are important. But our role is to play at the behavioral one. If we wanted to play at neuroscience then we should become neuroscientists. Just my 2 cents.

- Does not seem as clear in research literature or urgent to most clients that I see
- Mixed empirical support; questionable associated ethical practices within biomedical approaches (psychiatry has historically stronger alignment with carceral and paternalistic mental health models)
- Some people misuse the term and apply it to make a treatment sound scientific
- Neurological assessments (imaging) are not affordable for many low-income patients. Study populations and variability in neuro findings limit generalizability to client populations.
- Training in neuroscience among the vast majority of mental health professionals is insufficient to integrate neuroscience into treatment. It's also unclear to me the extent to which it is helpful.
- Very little to offer at this point. However, it holds promise
- Many neuroscience findings are highly uncertain, both with regard to small effect sizes (i.e., they are not fully comprehensive explanations) and with regard to generalizability to real world practice
- I think we often overstate the conclusiveness of findings as clinicians, but I don't necessarily see that as inherently a problem. Leveraging expectancy effects is a valid consideration.
- It seems like it is moving towards being in the scope of mental health practice but it's not quite there yet bc there is a chasm between neuroscientific findings and treatment for many disorders.
- it is within the scope but has not shown validity or benefit to clients up to this point
- I'm not sure if I'm interpreting this question correctly. I don't think that currently there is a lot of good evidence for it benefitting mental health practice. However, I am hopeful that we will be able to utilize neuroscientific findings to enhance/improve asssessment, prevention, and treatment.
- I am very skeptical that 'neuroscience' is actually being applied rigorously to clinical intervention at this juncture. There is a lot of talk and hand-waving, but very little that draws in any rigorous way on the actual literature and even less on demonstrating that a change in a brain state mediates/moderates clinical outcome. Much of this is VERY premature to say the least.
- To paraphrase Skinner, behavior describes the actions of an organism, not an organ. While I find neuroscience interesting, I rarely feel it meaningfully adds to a behavioral conceptualization.
- Not outside the scope of clinical psychologists because they have basic training in neuroscience. However, for other behavioral health fields (e.g., social work, master's level psychology programs) I worry about the lack of foundational training.

**Additional comments**

- Too often neuroscience is used to promote something that has not been tested or is poorly supported
- We need to think bigger including evolutionary biology, neuroscience and learning principles. We have been stagnating. Contextual behavioral scientists are on to something. Let's be curious.
- The challenge is to avoid a reductionistic model of mental illness.
- I have been integrating an affective neuroscience explanation into the psychoeducation portion of my EBPs with good success, particularly amongst Veterans
- I just received further NIMH funding to expand the Unstuck and On Target curriculum upwards to high school students; we provide education on bio basis of EF, and focus on neurodiversity/self-advocacy, planning, organization, and flexibility. Happy to help in any way with the article