**Your Mind on Loneliness & Social Connection, with Dr. Elisa Baek**

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0:00:05.9 Ava Ma De Sousa: Welcome to Minds Matter. I'm Ava.

0:00:08.7 Beth Fisher: And I'm Beth.

0:00:10.4 Ava Ma De Sousa: This week, I spoke to Dr. Elisa Baek, who is currently a post-doc at UCLA and a soon to be Assistant Professor of Psychology at the University of Southern California starting in January 2023.

0:00:21.2 Dr. Elisa Baek: I did my undergraduate at the University of Pennsylvania, and I double majored in Communication and Cognitive neuroscience. So in undergrad, I double-majored in these two majors that really did not have any overlap or connection and I didn't see how there could be a connection between the two, between my two interests. And then I took a few years off and worked in private industry for a few years and then went back to the University of Pennsylvania to pursue my PhD in communication. And there I was just so lucky to be able to work with Emily Falk, who ended up becoming my PhD advisor, who was really a pioneer in combining communication and neuroscience, basically using neuro-scientific tools to answer questions that are of interest in communication.

0:01:10.6 Dr. Elisa Baek: So it was really, honestly, a perfect fit. And there I was really interested in the role that information sharing plays in our society and the way that it plays in the way that we create shared realities of the world around us and how it helps us socially connect with one another. And that led to me where I am currently, wrapping up my post-doc at UCLA working with Carolyn Parkinson. And in my years as a post-doc, I started to be really interested in what distinguishes people who are really well-connected and who experience high levels of social connections versus individuals who may be struggling with these elements, and I really learn through collaboration with applied mathematicians to incorporate social network analysis and the brain to understand a little bit more of how characteristics of individual social world influence the way that they use their brains and vice versa.

0:02:07.0 Ava Ma De Sousa: You mentioned that you do social network analysis. Could you just explain a little bit more of what that is?

0:02:12.1 Dr. Elisa Baek: The work that I've been doing is to characterize individuals offline or real world, the social world. So in the last few years, what we've been doing is characterising the social network of a bounded community or a social group. So in our case, it was first year university students who were living in the same residence hall, so that you bound a community. But you can also do this with different types of communities, a lot of people have done this with business organizations or sports teams and so on. And basically, in our case, we ask the individuals within that bounded community who they're friends with, who they're connected with, how close they feel to other individuals. And by gathering information on individuals in this entire bounded group, you can get information that is just beyond what the individual reports, so not only who I report as a friend, but how many people report me as a friend. So I think that's an advantage of the socio-centric social network analysis approach, where you really try to characterize different aspects of an entire bounded community.

0:03:16.9 Ava Ma De Sousa: One of the things that you were interested in, as you mentioned, is what distinguishes people who are highly central in their social network, so does that correspond to people who have a lot of friends and who other people name as a good friend? Is that what you talk about as "popularity" when you're writing your studies?

0:03:31.9 Dr. Elisa Baek: It's a really good question. So I think the reason that I'm really interested and excited about this work is because being well-connected in a social network or highly central in a social network is protective against social disconnection, and we can talk about this later, but as the pandemic has really shown us, a lack of social connection is very detrimental for not only mental well-being, but individuals physical well-being, and I think now there are decades of research showing that loneliness or the subjective signs of social disconnection is linked to increased rate of mortality that persists even when you control for all sorts of comorbidities. So with that said, I think we are just beginning to get at these questions.

0:04:13.1 Dr. Elisa Baek: So the first set of analyses that I did was looking at people who we define as well connected in their social network, and I think it's really important to think very carefully about the implications that can be drawn by the way that we defined what well-connected means. So in this specific case, well connectedness was defined by the number of people that indicate you as a friend in the social network in this bounded community in the same residence hall. In some of the earlier talks that I gave about this paper, I referred to that as popularity, but I think popularity is actually a little bit distinct from the way that we defined well connectedness or friendship. In this case, because there's some research that seems to suggest...

0:04:57.9 Dr. Elisa Baek: Again, this is not my work, but popularity specifically in the context of high school and younger, there is some evidence seeming to suggest that adolescents and kids who are popular actually have less well-being. So we gotta be really careful with the way we define this, 'cause I think it's very distinct from being well liked to having a lot of friends, 'cause they are stressed about keeping status, popularity and status is different than being well-liked or having a lot of friends or having a lot of people say you're a friend.

0:05:27.0 Ava Ma De Sousa: Maybe you can give a little rundown into the study that you ran, how you collected the data and some of the findings that you got.

0:05:33.2 Dr. Elisa Baek: So in this study, first set of analysis was really looking at the extent to which an individual is well-connected as defined by the number of people that nominate them as a friend and relating that to people's neuro responses while they were watching a bunch of different naturalistic videos. And I think one advantage of using videos or measuring brain responses while people are watching videos in the scanner is that we're able to capture the way that people may process everyday scenes as reflected in these videos, so they're more complex than some of the more traditional or earlier social neuroscience work where people were shown very simple texts that were very tightly controlled, but didn't have this validity in that, that's not what they're encountering in everyday life. So by instead showing people video clips of social scenes that unfold over time that are really reflective of a social scene that you might encounter in everyday life or social interaction, we can get a little bit of the more the nuance of how people's brain responses unfold over time as they are experiencing videos that are more reflective of what goes on in every day interaction.

0:06:47.4 Dr. Elisa Baek: So basically what we did was for each participant, you can just get neuro responses that unfold in each brain region across the whole brain. So for each region in the brain, you can get their time courses of the responses in that brain as people are watching these videos. So for each region of the brain, for each participant, you get one time series of brain responses during the video watching task, and then for each unique pair of participants, you can then correlate the time courses in each brain region between two participants that gives you a measure of how similar the two participants responses in a specific given region of the brain is across the whole task. In one region of the brain, you can see if these two participants are really, really similar because you can correlate the brain responses in that region of the brain between the two participants and then see if certain participants are more similar or had higher correlation than other pairs of participants and this method is called inter-subject correlation.

0:07:49.6 Ava Ma De Sousa: What were the findings with looking at the brain and looking at centrality or lack of centrality for individuals?

0:07:55.2 Dr. Elisa Baek: So what we found was that individuals who are highly central or who are well connected in the social network were on average, if you look at the whole brain as just a pattern, more similar to every other member in their social network compared to less well-connected individuals. It just seems to suggest that people who are really central have the most normative neuro responses when they're watching these different types of video clips, more normative to their community compared to less central people who are more idiosyncratic. And we also found that these pattern of results followed what we call the Anna Karenina effect, which is derived from the famous line from the novel, Anna Karenina, which says that, "Happy families are all alike, but every unhappy family is unhappy in its own way." So it's suggesting that happy families are all similar, whereas unhappy families are each different in its own way, and we also found that to be the case in our study where we found that well-connected individuals are alike, but that each less well-connected person seemed to process the world or have neuro responses that were dissimilar in their own way. So this basically suggests that less well-connected people were not only dissimilar in their neuro responses to the well-connected people, but to each other.

0:09:12.0 Dr. Elisa Baek: So they're actually more similar to the well-connected people than to one another. So it's not that. An alternative hypothesis could be that all the well-connected people are really similar in the way that they process the world and the less well-connected people are all similar. So there's a grouping effect, but instead what we find is that well-connected people are really remarkably similar to one another, but each less well-connected person, is kind of idiosyncratic. So they're processing the world where... As shown by their neuro responses in their own unique way, which may be why they are not as well connected, 'cause they're processing the world or understanding is similar in a way that isn't reflective of the norms of the group.

0:09:50.8 Ava Ma De Sousa: Did this pattern of data replicate in all of the brain regions that you looked at or were their brain regions that were specifically strong?

0:09:58.1 Dr. Elisa Baek: So while we saw these pattern of results generally across the whole brain, specifically the most robust effects were found in regions of the deformable network, which overlap also with the social cognition regions of the brain. These regions reliably activate when people engage in social cognition, such as mentalizing when people are actively thinking about the mental states and perspectives of other people. And interestingly, prior work has shown that similarities in these regions of the brain have been linked to similar understandings of events, such that basically people who have similar understandings of an interpretation and views about videos also show neuro responses that are similar, but specifically in these regions of the deformable network, and these are the regions where we found that the well-connected individuals were remarkably similar to one another and normative or on average, similar to other community members whereas less well-connected individuals are idiosyncratic and dissimilar. So it seems to suggest that it's not that, for instance, less well-connected individuals see things like color and perception differently when they're watching these videos, it's really that they're understanding at a higher level differently compared to the well-connected individuals.

0:11:14.0 Ava Ma De Sousa: Did you see differences in the type of video, 'cause you mentioned that there were a lot of different types, so was it like the sports game that they would be seeing it more similarly, whereas the awkward date maybe was something that people were interpreting more differently?

0:11:26.8 Dr. Elisa Baek: Yeah, that's an excellent question. So a big caveat to what [0:11:31.3] \_\_\_\_ are sandwiched between two different types of stimuli, or is it because our study wasn't designed to be able to detect video level effect, everything I'm about to say is speculative and future work really needs to be done. So, for instance, in our study, all participants, all the videos in exactly the same order, so it's hard to disentangle whether any video level effect that we see is because it was really unique to the video. And also, some of the video clips are longer than others, which I think can also be a compound because we know for inter-subject correlation, there's higher inter-subject correlation with longer videos. So with all these caveats in mind, I do think it's really interesting because where we saw the strongest effects of the videos that elicited the greatest effects were, again, well-connected individuals were more similar in neuro responses compared to less well-connected individuals. For video clips that had a little bit of ambiguity of social narratives that weren't so straightforward, so for instance that awkward date between two teenagers or that party scene actually didn't do as well in terms of didn't yield the greatest effects.

0:12:37.6 Dr. Elisa Baek: What yielded the greatest effects were, there was this one video that we show, which is animated of Zima Blue, which is part of a series on Netflix. Basically, it was a really abstract story where it really got people to think, and I just remember in our lab, there were some people that were like, I don't get what this is about, they're trying to be too profound, whereas other people really enjoyed it. So this video clip did very well, and I think it's because of the abstract nature, 'cause I think the video clips are very clearly social, maybe a little bit more straightforward in interpretation, whereas the abstract social clips and elements and the narratives that really unfold with perhaps an element of surprise is where we really see the distinction. So I think it seems to suggest, again, with all the caveats in mind, that the nuances of the social meaning and value and interpretation is what we may be capturing in the neuro responses that distinguish well-connected individuals. But again, I think this is a really interesting future direction to look at, because how "different" are the less well-connected individuals from the well-connected individuals and in what situations do these differences come up?

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0:13:57.7 Beth Fisher: So what I thought was so interesting, my idea of someone who's well connected or I know we don't wanna use the word popular, but I don't know, well-liked, you don't think that that's the norm. You think that they stand out because they're special in some way and they stand out from the rest, and I thought this idea that the average is what is liked the most, but it doesn't seem to be true to experience 'cause it's the people who are pushing the boundaries and making jokes or whatever, who are standing out, who seem to be the ones that have the connections.

0:14:33.6 Ava Ma De Sousa: I think it's also not necessarily that people would say that those people are average, 'cause the finding is that their brains are responding to these stimuli, specifically ambiguous stimuli, in ways that are more similar to the way that other people are, which basically means they're interpreting events in a way that is similar to the norm. I think it's not that they're necessarily average people, but that they understand how to interpret the world in a way that makes sense in their context.

0:15:07.7 Beth Fisher: Yeah, then I was thinking about that, but I thought maybe really creative people aren't well-connected, but I was thinking of artists and all these people who see the world differently, but I mean, I suppose that is different from being connected. We might aspire to be like them or look up to them, but that doesn't necessarily mean they're very connected. I guess that's two different things.

0:15:26.1 Ava Ma De Sousa: Yeah, exactly. And that's also something that Elisa was talking about in terms of the fact that status is very different from the way that they were defining well-connectedness, which is good to remind ourselves of what they actually were doing because we can label it things like well-connected, well-liked, popular, but it's actually just that they were looking at the people who the most people nominated as their friends. And maybe if there was someone who were an artist or someone who had really high status, that people also might not be as likely to nominate them as a friend because maybe they think that that person is out of their realm of potential friendship because they're on a different level. So I think that's also interesting, the link between all those types of concepts, status and admiration and well-connectedness.

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0:16:18.5 Ava Ma De Sousa: So if there were someone who didn't have as many friends but had a very tight network where person A, person B, and person C are all reporting each other as friends, did you look into or... And if you did, did you see any effects of all three of those friends being more similar? So is it like predicting something like friendship and closeness, or is it really just this idea of popular people are processing the world in more of a general normative way?

0:16:41.0 Dr. Elisa Baek: So prior work done by Carolyn Parkinson has shown that friends are remarkably similar in the way that their brain responses during these videos. So in all of my results, we control for friendship, so it's not simply that the well-connected individuals have a ton of friends and all of their friends did the study and therefore confirmed there was friendship. So it controls for that. So I think it does seem to suggest that the well-connected individuals generally have a broader sense of normative neuro responses beyond just friendship. But in the case that if we have three or four individuals that are just friends with one another and apart from the network, I would say that I don't think we have a large enough sample size to be able to really look at this, but my best guess would be that based on all that I know about this literature and what's been found and what we found is that the four individuals would have very similar neuro responses to one another that may be just different from the core group if they're not really connected to the core group.

0:17:37.2 Ava Ma De Sousa: So there is evidence of the folk idea that you are a mix of your five closest friends type thing?

0:17:43.2 Dr. Elisa Baek: Yeah, I think so. I think some of this work is really interesting, the friendship work that was done earlier is really interesting because it does seem to show that the influence of your friends may be even bigger than we think, because if it's affecting your neuro biological responses. And we can talk about the causal direction, because we still don't know, you can't say for certain the causal direction of these affects with certainty for various reasons. But I do think that the way your brain responds to novel situations is remarkably similar to your friends, and then it's next similar to your friends of friends, and then your friends of friends and friends, and then I think it predicts still for a degree of distance in the network. So it's not only important who your friends are, but who they're friends with as well.

0:18:27.0 Ava Ma De Sousa: Maybe we can talk a little bit about the causal directions of it. I was wondering specifically because I was thinking about the logistics of the study you ran with being in a college dorm. I was wondering if there's students who come in who maybe are peripheral to the central network because they don't know as many people, maybe they're from out of town or they're international students, if those people are peripheral but they start off being peripheral, could they then be forced into their neurobiology changing even further to be less normative? Or do people who just process the world in more normative ways tend to then get into the center of their social circles?

0:19:01.5 Dr. Elisa Baek: Yeah, I think about the causal directions of this a lot and I get asked that a lot and I think it's a really important question to ask this question of homophily versus social influence. So I think these two questions, is it that people who end up being really well connected in a social network, they're so influential that everybody else's neuro responses becomes more similar to theirs because they're super influential? Or is it that the well connected individuals are maybe more socially influenced so they are like social chameleons, they just conform to whatever the group's normative ways of interpreting and understanding the world is? So is it that if you pluck somebody who's well connected in one social network and then put 'em in a completely different environment and a different social network, would they either become more normative reflective of whatever the norms are of the community too or will all the other people conform to them 'cause they're so influential?

0:19:54.5 Dr. Elisa Baek: Unfortunately we don't have the data to speak for this, so we would have been able to, but then COVID happened, so we are supposed to get a second wave of this data, which I think would've given us some insight into some of these questions. Without that, it's always fun to speculate based on what we do know and some other work that's been done. I think that there's definitely an element of both. But if I had to guess, I think it's actually more likely that the individuals who end up becoming really well connected in a social network who have a lot of friends, have higher need to belong and are actually more likely to be socially influenced. And so I think that it's more that they're actually changing, not consciously necessarily, but because they really wanna fit in and they have high need to fit in that they're changing the way that they're responding to the world based on the norms of the community.

0:20:46.2 Dr. Elisa Baek: And I have a little bit of data to speak to this. We have a separate data set in a completely different population and with collaborators in South Korea that mapped out the entire social network of a village, older adults living in a farming community and village. So again, this is the bounded community but at a more massive scale than us, an entire village. They're fairly isolated 'cause I think they lived on an island and you can figure out who's friends with whom. And then they also did FMI portion of that too. So the crazy massive dataset that I was fortunate to able to collaborate with and I did some preliminary analysis on that dataset seem to suggest that individuals who are really well connected in this completely different cultural context seem to show the greatest neural sensitivity when they're being socially rejected in the scanner.

0:21:33.7 Dr. Elisa Baek: The cyberball task for people who may be familiar with this or when they're being excluded, they show greater responses in brain regions that have been associated with emotional distress compared to less well connected individuals. And what's really interesting was that this is moderated by the type of relationship that they have with the rejecters or who they thought were rejected. Of course this was experimentally manipulated. So when they were being rejected or they thought they were being rejected by strangers who live in the same village as them, so people who are, they're not friends with or who are not family members, they have greater sensitivity to rejection as shown by these responses and these brain regions associated with emotional distress. So it's really, really interesting. I think that's preliminary, but it seems to suggest that people who have a lot of friends may have a lot of friends because they have a need to be really well connected in their social network, have a higher need to belong and they may conform more or be more sensitive to rejection, which then may lead them to have neuro responses that are more normative.

0:22:37.4 Dr. Elisa Baek: So if I had to speculate, I think that might be more of a case than the opposite. And I also am really interested in this idea of influence 'cause I do think there are individuals that are very influential, but I don't think those people necessarily have the most number of friends, maybe admirers. But I think future work really needs to disentangle all of the different types of relationships and what does well connected mean, what is popularity, what is status, what's influence? So that's something that I'm really excited to do in the future years to come.

0:23:06.8 Ava Ma De Sousa: That is so interesting, also because as you mentioned at the beginning, one of the reasons that it's interesting to look at well connectedness and people who are central to these networks is because we know that loneliness is as predictive of early death as smoking or something or even more so. But it seems like the people who are also pushing themselves into the center of the network are also the ones that are most sensitive. I don't know if you have data that speaks to whether this type of centrality that you were looking at where other people are nominating you as a friend, whether that is protective. So do you think it would be that it's protective even though they're more vulnerable so they're just pushing themselves over the edge to being okay even though they're baseline is that they're not okay if they're by themselves?

0:23:46.8 Dr. Elisa Baek: These are questions that I think about a lo, t because to what extent is the sensitivity to social ties or the lack thereof adaptive or maladaptive? Because I think if you're hypersensitive and you need a lot of friends all the time or people's affirmation, I think that could not be super good for your well-being either. Where is the balance? I think that the narrative can sometimes be super simplified, "Have more friends, you're less likely to be lonely." And while those things are generally true, I think we also need to start looking at some of the nuances of this. So I think speaking of loneliness, I think there is this distinction between what we call objective social connections with the number of social ties, or about how big your social network is compared to subjective social connection is how lonely do I feel, which is a subjective thing.

0:24:36.0 Dr. Elisa Baek: They're related, right, in that people who have larger social networks and the people who have more social ties or friends tend to be less lonely. But the correlation's actually small to moderate in our sample. I just checked it today in preparation, the correlation was 0.3, so it's not super strong. And I did some digging as well because what's really interesting is, as I said earlier, this was supposed to be a longitudinal study, so we would get social network and brain data at multiple time points, but because of COVID we couldn't get real measure of social network because people moved out of their dorms 'cause of the pandemic or brain responses at times too. But we did get crude measures of social network, like who do you keep in ties with virtually, as well as people's sense of loneliness at both time points. So what's really interesting is we gathered this data of loneliness, social network and brains starting in the fall of 2019, and then all the data collection for the social network survey for time one ended in January and then the pandemic and everything shut down in March of 2020. Right?

0:25:37.3 Dr. Elisa Baek: So then we have this natural experiment and then we also gather loneliness data as well as various things about people's perceptions and social networks at June to August of 2020. So I was digging around in this data and something that I've been really interested in looking at. So one, to no one's surprise, overwhelmingly there was an increase of loneliness just generally after the pandemic hit. And then I looked at who's more susceptible to increase in their loneliness. So if you just subtract people's loneliness score between before the pandemic, so positive numbers means that you increase in loneliness and negative numbers means that you decrease in loneliness after the pandemic. It turns out that people who were less lonely prior to the pandemic hitting increase more in loneliness compared to people who are already lonely. And then you ask, oh is this a ceiling effect?

0:26:24.6 Dr. Elisa Baek: Is it just that the lonely people were already super lonely, so there's nowhere more to go on the scale? And unfortunately it does seem to be that case because people who were already lonely before the pandemic were still on average more lonely after the pandemic than the people who were not lonely before the pandemic, even though the jump of loneliness scores between time two and time one was significantly more for the people who are not lonely. So they increased significantly more, but it's more like the non lonely people match the lonely people who are already there before the pandemic. And then I looked at the role of objective social connections. So the number of friends that you have at time one and then seeing how that may be protective or not in loneliness. What I found was that the people who seem to be at the most risk of having the greatest jump in loneliness after the pandemic hit were people who had high levels of loneliness at time one, so before the pandemic, but who also had the highest number of friends.

0:27:27.9 Dr. Elisa Baek: So again, generally there's this link that's negative, so more friends, less lonely, but there are people again because the correlation is 0.3, so it's not super tightly correlated. So there are people who have a lot of friends who are experiencing high levels of loneliness and those individuals were at the highest risk of increasing their loneliness at time two. And at time one we also see a little bit of pattern of behavior suggesting that these individuals also seem to have the most risky norms about alcohol use, which is very relevant in our college students, right? This is when a lot of people start drinking. So it's really interesting [0:28:04.3] \_\_\_\_, I think while there is this correlation, this negative correlation between loneliness and the number of social ties that you have, there are people who have just one or two good friends and they're not lonely at all. And then there are people who have 15 friends and are really lonely. So I'm really interested in that difference because at the end of the day the subjective sense of loneliness seems to be a stronger driver of well-being or predictor of well-being. So I think another future step that I'm really excited about is exploring these people who have a lot of friends but are really lonely because I think they may be highly susceptible developing things like mood disorders and substance abuse.

0:28:44.4 Ava Ma De Sousa: I always wonder sometimes when we find patterns like this, do you think that on some level people are aware that there is a mismatch between their objective circumstance and their subjective feeling? Is part of it driven by the knowledge that there's a mismatch and therefore they shouldn't be feeling this way and that makes it worse?

0:29:03.1 Dr. Elisa Baek: That's really interesting. I don't have any data to speak to people's knowledge, but this is tangential. But I think it's also interesting to see those accuracies of their perceptions of their social networks. It's either how many people I think I'm friends with and then do they think they're friends with me back? Or also who I think are friends and who are actually friends in the social network? So it's really interesting. I was having this discussion with somebody at a conference recently about, is it that people who are really well connected and centrally located, do they have more accurate views of themselves and where they are in the social network versus people who are less centrally located? I think there is some evidence that seems to suggest that people who are well connected do seem to have higher accuracy of where they stand in their social network. That doesn't quite answer what you were asking about, but I think it's related and really interesting 'cause loneliness is often described or operationalized as this gap between what you wanna feel versus what you feel, right, in terms of social connection. So maybe having many, many social ties but feeling really isolated exacerbates the gap that you wanna be feeling versus what you are feeling. And then that leads into, "Oh, how can we have interventions to address these things?" which is why we do this work in the first place.

0:30:25.0 Ava Ma De Sousa: Another question that I had that was kind of sparked by you bringing up the binge drinking, also because it's in this college context, because you operationalized, which just means the question that you asked to measure social connectedness was about how much time you spend with people?

0:30:39.0 Dr. Elisa Baek: People who you regularly spend your free time with.

0:30:43.8 Ava Ma De Sousa: So I'm just wondering because if I think all the way back to my early freshman college days, there would be a lot of social occasions where there would be tons of people who you weren't necessarily close with, the quality of friendship wasn't very elevated but you spent a lot of time with them because of propinquity, just meaning that you live in the same dorm, so you're in the same place, you're probably drinking together. So did you get any measures of quality of friendship and is there a potential for these people who are high in loneliness but also have a lot of friends just not having a lot of soul friends as you might call them?

0:31:16.3 Dr. Elisa Baek: Yeah, that's an excellent question. We do have data on how close people felt to each person. Haven't looked at that yet, but that's been on my to-do list and I think a lot of behavioral work that's already been done do seem to suggest that it's how close you feel, the subjective sense of closeness that you have to your socialized matters more to loneliness than just the sheer number of friends that you have. But that's a really good question and I wonder if, like you said, that's the distinction between the people who are highly central, who have a lot of friends who don't feel lonely versus the people that do.

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0:31:55.2 Ava Ma De Sousa: I think that directionality question is really interesting. What I find interesting about it is that it's like these people's brain responses are most similar to the average, but it might not be that they just from birth are somehow perfectly attuned to how their social worlds are interpreting things. But it's more maybe that these people are very good at picking up on implicit cues of how things are supposed to function. And what I find interesting that unfortunately as Elisa said, she didn't have the data to speak to it yet, but was that maybe these people, if they were then thrown into a new social circle, that they might actually change the way that their brain is responding to match that new group. Social network stuff takes a lot of effort, but if they had an entire high school and they were able to analyze everyone from that high school and then they were able to find the most well-connected people in those high schools and then follow them into undergrad and see whether their brain patterns actually shift to be more normative, I think that would be really cool. But again, it just seems like well-connected people are actually maybe picking up on some kinds of implicit social cues because they have this higher need to belong. So it's not that they're the magnetic people necessarily, it's that they mold themselves to fit their environment.

0:33:07.7 Beth Fisher: I also think in terms of thinking about it from high school and university, and I don't know what other people's experiences were, but I had the worst time in high school. And university, I had a great time. So I necessarily wouldn't think that to be well connected or to fit in or whatever in high school necessarily translates to later on. So it would be interesting to look at to see how that happens. 'Cause I think the reverse would happen, people who did really well in high school kind of don't fit into the university structure and vice versa.

0:33:41.2 Ava Ma De Sousa: Yeah, that's a really good question too, whether it is something about finding your people type of thing, that kind of classic experience, which maybe Beth had of like someone who maybe doesn't fit in as much in high school, but then they're able to find more people who are more like-minded, literally, according to Elisa's stuff, in university, and that it's really about finding those like-minded people and that if you just took that small circle that everyone's brain responses would be more similar. But then if you dropped that person into a different circumstance, how would that work? And I think also a really interesting question is also cross-cultural. How much does this extent, how much is it really that these well-connected people are really super malleable and how much is it that they just got lucky and are in the right space where they really feel like they understand how this situation works? Because it's possible that a very well-connected person, one culture, if you drop them in another culture would be very disconnected and would not be having similar brain responses because everything is so different.

0:34:42.9 Ava Ma De Sousa: Or it could be that these types of people are just really good at picking up on some kind of implicit cues and they have really strong motivations to try to adapt themselves to the norms of wherever they are and that maybe those people are better at fitting in later on as well. The finding on the directionality, that does seem like it's these people who have a strong need to belong, because there's evidence that people who are well connected are also people who are the most sensitive to rejection, even by people that they didn't know, like strangers in the town.

0:35:11.9 Ava Ma De Sousa: I think that that also, I don't know if it brings up another directionality question or if it's just that the main directionality question isn't solved, but I was thinking that it's also possible that these people who are well connected are most sensitive to rejection, not because originally they have a really intense need to belong, but maybe because they're just not used to rejection, so it feels worse because they aren't accustomed to that feeling at all. So it's kind of unclear. But I think in any case, even if these people maybe aren't used to being rejected, but do feel an intense negative affect when they are rejected, it kind of doesn't matter where it comes from because if in the end it makes them more sensitive to rejection and then makes them want to engage more with other people, then they do become people with more intense need to belong than others.

0:36:01.5 Beth Fisher: I'm also curious to how, I mean a lot of things about these people, whoever they may be, I think a lot of it probably is to do with how people have developed and their life experience abandonment can, people can develop those kind of people pleasing ways of coping after that because that's one way not to be abandoned. So I would be very curious to see how those kind of things linked up.

0:36:28.3 Ava Ma De Sousa: Yeah, it's interesting. It's true that it does kind of sound like almost these are sort of people pleasers in the way that it's defined and in in the way that... And what it correlates with. We'll have to ask Elisa if she would agree with, instead of it being about popularity, it's actually just people pleasing.

0:36:44.1 Beth Fisher: Yes. And then also there would have to be something in terms of empathy because a well connected person, yes, they might experience some things the same, but it's also an understanding of others on a different level.

0:37:00.2 Ava Ma De Sousa: Yeah, absolutely. I think it sounds like there's an understanding of others not only on an individual level and maybe not necessarily on an individual level. To be well connected, maybe you don't have to be super tuned into what everyone is feeling all the time, but maybe you do have to be relatively well tuned into the norms of whatever circle that you're in and how you're supposed to be interpreting the world maybe so as to act in the world in a way that people deem correct.

0:37:31.1 Ava Ma De Sousa: You've touched on it when you've been explaining other things, but is there anything that you are really excited about in exploring further that maybe we haven't touched on yet?

0:37:39.9 Dr. Elisa Baek: Yeah, so this is 10-15 years down the road, thing that I'm excited about eventually getting to, maybe post-tenure because I think it may be high risk, high reward kind of situation, is that I'm really interested in intervention work. So if we do have these preliminary findings, which I wanna do more work on to explore further and be a little bit more nuanced, that seems to suggest that this shared understanding of the world, having a sense of shared understanding of the world around you as other community members is really important in social connections, both in terms of where you end up in your social network, what your social network position and how central you are. As well as your subjective sense of social connection or loneliness, could we maybe do interventions that seek to promote shared understanding between individuals that might be able to prevent or help these individuals who are at the edges of these social networks feel more connected to the community that they're part of?

0:38:37.1 Dr. Elisa Baek: So I think that this can be important and one advantage of doing this kind of work in the college population, which as we know, a lot of psychology work has been done in college students. And then there's a question of how valid it is in terms of external validity and how translatable these results are to normal people outside of college. But I think my work doing it in the college context could be really powerful because one, I think empirically based interventions based on these results to try to cultivate shared understanding could be done fairly easily in a college context. Like if you take the dormitory floor or the club.

0:39:12.1 Dr. Elisa Baek: And I think two, can be really important because these early 20s are when these mood disorders and substance abuse disorders start really emerging. And three, when we think about elite universities in the United States at least, and who feels very easily belonged and then who doesn't, individuals from traditionally historically marginalized and underprivileged backgrounds and international students as you mentioned, who maybe higher risk of developing social disconnection or not feeling belong and how can we promote that in the community? And I think very, very broadly, it could also have implications for things like inter-group relations and the tumultuous political situation that we're living in in the US and in the world more broadly. Those are very lofty ideas, which is why I said 10, 15 years on the road. But that is kind of the hope, to really link my motivation for understanding these processes in the brain, is so that we can help uncover these mechanisms that can then help us design targeted interventions that can help us understand one another a little bit better.

0:40:18.4 Ava Ma De Sousa: I have a thousand questions now, but I'll try to just stick it to maybe two. I know you're saying 15 years down the lines, so you probably don't have a great idea of this, but I'm just wondering because it's so hard, it seems to cross party lines and to have people on Twitter understand each other, especially because your findings implicate this neurobiology. Although we know our brain is malleable, what types of targets, you feel like, if you have any idea of that you could go for?

0:40:43.0 Dr. Elisa Baek: Yeah, so this is all speculative and I just wanna respect the scholars that are much more involved in studying inter-group relations than I am. But I think one idea that I had was, so there's this one recent study that showed that you can increase inter-subject correlation in the brain. So you can get individuals to have increased neuro similarity in brain regions by having them do like an ambiguous task and then they come to a mutual understanding of it, and then if you stick them back into the scanner, then their neuro responses become more similar to one another. So if you have two groups and then they do consensus reaching, I think is what they called it, they discussed this ambiguous stimuli and then these two groups came to different conclusions, right? Because they discussed in separate groups. And then if you look at the neuro responses of people in each group, you can see that they were remarkably similar to the group that they're assigned to that they came to consensus with versus a group that came to a different consensus.

0:41:40.9 Dr. Elisa Baek: So that made me wonder if we could do some kind of intervention where people engage in some kind of ambiguous tasks that're probably gonna have to be super not political, right? Because I think we're too, maybe stuck in our ways, but if they're doing some kind of ambiguous task, and again, in a college dormitory context, residence floors have events all the time. So if you can get people to go do something that no one knows anything about and then they come out with a shared understanding or experience, maybe that will translate to other sectors of their beliefs or maybe not, I don't know. I was thinking about, sometimes you think that's someone's super different from you and then you have one good conversation with them and that changes your relationship with them forever. So I think about empirically based interventions to promote these kind of engagements more.

0:42:28.4 Dr. Elisa Baek: There's also some work that's being done at UCLA, not in my current lab, but in some of the early grad students. And this is super early work, but that seems to suggest that when they did have people who were Republicans and Democrats come together and just discuss over Zoom, and this was done over Zoom because it was during the pandemic, people actually came out of having conversations with someone who had very different views on a very polarized topic such as abortion, gun rights, that both individuals came out feeling a little bit more connected to the others. I think a lot of times I wonder if it's that we think that we're more different than we are, or maybe we are really different, but a conversation helps.

0:43:10.9 Ava Ma De Sousa: One of the things that I find so interesting about your work is that it suggests that we are different. It's not just, oh, if we have a conversation, oh, we can come together. It's like, no, we're really perceiving the world in different ways. And I guess if we can just have a conversation and then we then become more similar, then that's great, but it seems like there is something kind of fundamentally different happening. And then I have a question that's potentially difficult to answer, but just because the intervention idea would be trying to get people to have more of a shared understanding and shared world-view, I feel like there's this criticism of psychology, specifically if we look at it from the individual lens where we're trying to prevent mood disorders, of this idea that psychology really tries to pull people to a certain norm and kind of enforces this normative view and is trying to get people to be in a certain way that is conforming rather than accepting how they are and changing broader structures. So I was just wondering if you have any ideas about that, if you could speak to that. I know that's a difficult question, but it was just something that I was thinking of as you talked about this.

0:44:11.4 Dr. Elisa Baek: Okay, so we talk about differences and people are different. It's crazy because it's a neurobiology, our brains are responding differently, but the differences are actually not that big. It's the 20% that's different. So the differences aren't great. People are approximately 80% similar, and then it's like the 20% that's different. It's not that someone's seeing the world as black and someone's seeing it as white. Okay, so the second question I think is a really challenging one because when we think about what's normative and is normative good? So that's so tricky because when we think about well-being at the individual level, yeah, conforming to the norms of society is a "good thing" for surviving and thriving as a human being. But should we be pushing against these harmful norms that we know exists at the institutional level? That's super tricky. I think it's such an important question to consider. I haven't thought very deeply into how we can push against that and how these findings fit into that. One thing that's related, but again, this is super tangential, is another thing that I've been thinking about a lot is, more like, so is your argument that we should just make everybody the same? Clearly, I don't think that's a good thing either. So I wonder if there's a way... Well, I think this is an open question also in terms of these interventions, would that make people who are on the outskirts of these social networks closer to the norm?

0:45:38.3 Dr. Elisa Baek: Or would that make the norms of the community a little bit further away, pull it a little bit towards the people who are on the outskirts of these social networks? And if so, how can we promote the latter instead of the former, especially if the norms are harmful and they have been perpetuated by systemic injustices that we know exist in this country. I think that's really, really important to consider. And as researchers for sure, I think it's very easy to be like, we just care about the science, but I think that's not okay. Yeah, as we know. The other thing is there's this trade off between creativity. People are like if everyone sees the world in a similar way, and that's great for social connection, but creativity is what's needed for scientific advancement, but also the arts. And the great poets of our society and the great artists, they were not seeing the world in a similar way. That's very true, but also true that these individuals often ended up with mental disorders, with extreme sense of loneliness. And so there seems to be this trade off, but I think it's really big question to tackle because we definitely don't want people to all just come out thinking exactly the same.

0:46:54.8 Ava Ma De Sousa: So one of the things that I found interesting in terms of her future direction ideas and the ideas on intervention is that she talked about these studies that find that across party lines, if people engage in ambiguous tasks together, that then their neural responses are a little bit more similar afterwards and that they also have maybe more empathy towards each other and feel more understanding towards each other. And there's actually this thing in education that's called the jigsaw classroom. And this was developed by a social psychologist, Elliot Aronson, who started this around the '70s, and it was specifically for the inter-group setting to try to have students a little bit more integrated. And it was kind of similar to what Elisa was talking about. I mean, it was called the jigsaw class because they divided the class into groups and they basically had to do a presentation or something or learn something together. And each member of the group got a different piece of information and they all had a different key piece of information and they had to work together to then be able to present that whole thing.

0:47:56.8 Ava Ma De Sousa: So it was this idea of everyone being essential to the group and the group not being able to function without every single piece of it. So creating that kind of mutual respect and valuing of other people. So it's interesting that maybe also working together on these types of tasks could change the synchrony of these people's brains as well, which I think is really interesting and kind of crazy. But this jigsaw classroom was shown to reduce stereotypes, reduce prejudice, and also a lot of the students had their own self-esteem increase in the jigsaw classroom compared to a traditional classroom. So it seems like those types of things and those types of interventions could work. And I think it's cool that Elisa might be bringing some of the neural piece to it as well.

0:48:44.0 Beth Fisher: Yeah, I think that's really cool. I guess when I first listened to it, I thought, oh, is well connectedness just giving up yourself or your personality to be part of the group? I think it's hard to see the boundary of giving something up of your personality in order to suit the group or just with the jigsaw task. I don't know if you have a shared neural response to that task, if that does then relate to your personality or if it's just specific to that task and that helps people work together.

0:49:17.8 Ava Ma De Sousa: Yeah, I mean that's a good question. And I think there are ways that potentially we could measure that by having... Maybe if these well connected people are people who are part of multiple social groups, an interesting thing to do maybe would be to have people in each of the groups that they're part of rate that person's personality or describe that person and see if there are a lot of differences. But it kind of reminds me of the fact that at work you have to be different than how you are at home or with your friends. I think some people might call that being a different person and "being fake."

0:49:52.3 Ava Ma De Sousa: But I think in other cases it's just that you're highlighting parts of yourself and you're just pulling back on other parts because you are trying to adapt to the situation. And I think also it does really depend on the culture because I think we and in the west have this really strong idea that we should have a stable self, but in other places you're not supposed to do that at all, you're supposed to be very variable across situations. But I think what's also interesting about this is that it's specifically that these people who are well connected are more normative to the entire group, which includes people that they probably don't even know, because if it's an entire dorm, I'm sure even the most well connected person isn't gonna be close to everyone in that group, but they're still understanding something about the norms as a whole. And I think it is kind of an open question as to whether understanding the norms of the group as a whole means that you're able to better adapt to each group that you're in, to shift, or whether you're just capturing something that groups everyone together in a sense. And I think those are still open questions.

0:50:50.7 Beth Fisher: No, but it's super cool and I think it's very exciting to have this new research that has all these questions because then there's so much you can do with it and different things to look at.

0:51:03.7 Ava Ma De Sousa: With the interventions she was talking about, there is an interesting tension between trying to have individuals have as much well-being as possible, which maybe is pulling people to a certain norm, or at least having people understand a norm of the way that we think about various situations. But then at the same time, as she said, there is this trade off between then losing creative people, artists, poets, things like that. And also scientists who are able to push things forward because they have a different type of vision. We need to be able to have those things, but at the same time, those people maybe aren't living a life that is as hedonically positive as we might want it to be or that they might be striving to have. And I think it's a little bit Brave New World-y, if anyone has read that book, as to whether we should be striving to have people be, have as much well-being as individuals as possible, or whether we should be making sure that our world is as equitable as possible. And I think we do need to try to pull a lot of institutions, they have norms that are not benefiting a lot of people from the group that are historically built on harmful ideologies that create the current current norm. So we want to pull those norms away from what they are, but that does probably cause more pain for the people in those situations.

0:52:28.9 Beth Fisher: Then you have to ask the question, well, what norm are we gonna set? Because we could go to a group that have, I don't know, been exposed to certain institutions or something and their norm is not a norm that's helpful or good for certain minorities or something. And so yeah, who decides what norm we set.

0:52:48.5 Ava Ma De Sousa: Exactly. And I think Elisa of course acknowledged this, but that pulling people blindly to whatever norm already exists, the descriptive norm that is currently the one that is in practice isn't what we want. Because there are some things that we do still wanna change, but it's true that the people who are able to live within these norms are the ones who experience the most well-being because they experience the most fit to their environment, which is really important. But I think that this tension is one that exists in a lot of social psych. It definitely exists in inter-group relations, and it's a tension that I think about a lot because there's a lot of work that comes from a prejudice reduction side, which sounds like something that we want, right? We don't want people to be prejudiced. We want people to be able to live harmoniously and we don't want people to be discriminated against because we want them to be able to flourish and not have to be stressed about discrimination all the time. We want people to live comfortable lives. But at the same time, in studies where they do do these interventions to reduce prejudice, a lot of the times the people who are involved in those interventions experience higher well-being, but then don't strive and don't have motivations to change the structures that they're living in.

0:53:58.1 Ava Ma De Sousa: I think that's a really difficult tension because we want people to live happy lives, but at the same time, just like in relationships, you need conflict to be able to grow. And we need conflict to be able to change harmful structures that we exist in, but increasing conflict obviously is gonna decrease well-being for individuals. So I think there's always a tension there and it's hard to figure out, especially as psychologists, what our place should be in those things. Especially when psychologists do intervention work, I think it's important for us to really think through where exactly we're coming from with these interventions and all of the consequences that they could have. And I think psychology often is really obviously end-focused on individuals because that's kind of the level at which we work at. But we do have to zoom out and see, okay, what are we actually doing? And will this reinforce harmful structures that we could potentially be doing something to change?

0:54:55.7 Ava Ma De Sousa: Thank you to Dr. Elisa Baek for joining us this episode. Our intro and outro music is Nobody Stayed for the DJ by Glassio. Our transition music is Back For More, also by Glassio. Minds Matter is mixed, edited and created by Beth Fisher, she's the Australian one, and me, Ava Ma de Sousa. We'll be back in two weeks with a brand new episode of Minds Matter. In the meantime, find all our episodes and show notes on mindsmatterpodcast.com.