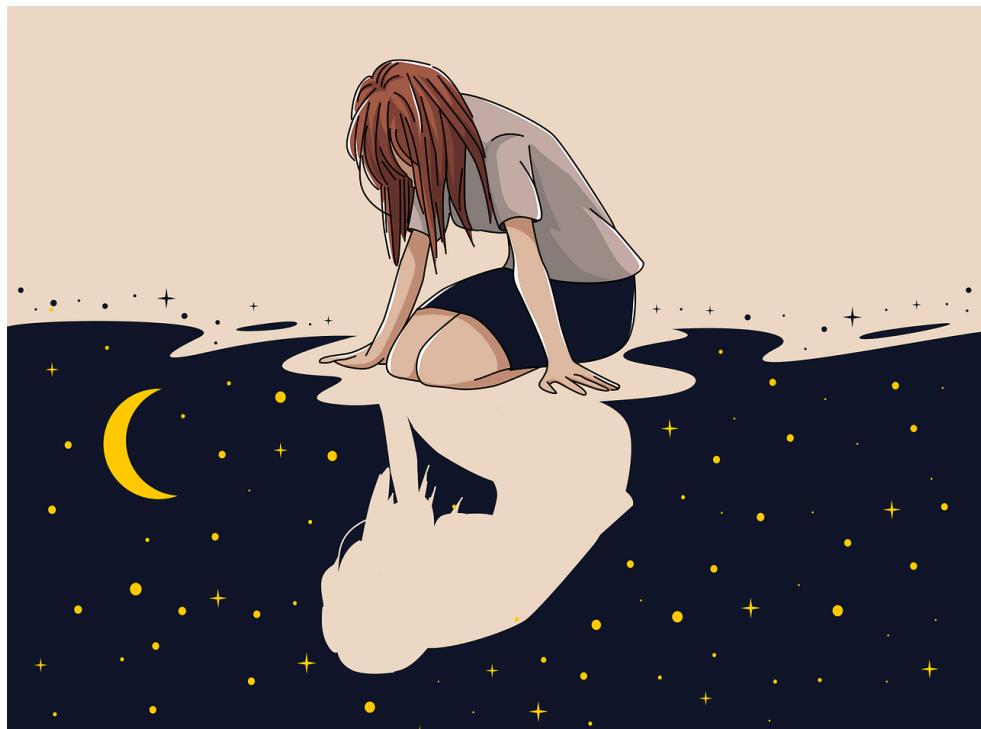


What Predicts Bouncing Back from Mental Health Struggles?

A data deep-dive into what life factors foretell mental health recovery in 13,000+ U.K. adults

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Introduction

[For a TL;DR, skip to the conclusion]

Life does not always hold our best interests at heart. We face despair from lost jobs, poor grades, or unmet expectations. We endure trauma from abuse or neglect. We suffer heartbreak from a failed relationship or a loved one's death.

Over time, our spirits can begin to break. To remain mentally free and happy in the midst of such struggles is not natural for us. Nonetheless, while everyone can have bad days, what signifies our mental health is how quickly and how well we rebound from the low periods in life, not whether we experience them at all.

But while some are able to better recover from such distress, far too many people across the world suffer from mental health struggles with no clear end in sight. To understand what factors

can help, datasets tracking individuals over time can show how life variables might predict who does and does not rebound from poor mental health.

Using national data from the UK Household Longitudinal Study from 2010 to 2024, we evaluated how the lives of over 13,000 struggling adults evolved over time alongside their GHQ-12 scores, a validated mental health screening measure where higher scores signify more distress.

In Part 1, we first establish the context of our daily lives—ranging from age to financial situation—with respect to mental health. Then in Parts 2 and 3, we use statistical modeling to reveal how physical health behaviors and social connections can predict chances of mental health recovery—suggesting how one might assist with recovery, both for themselves and others.

Part 1: The Quick Context

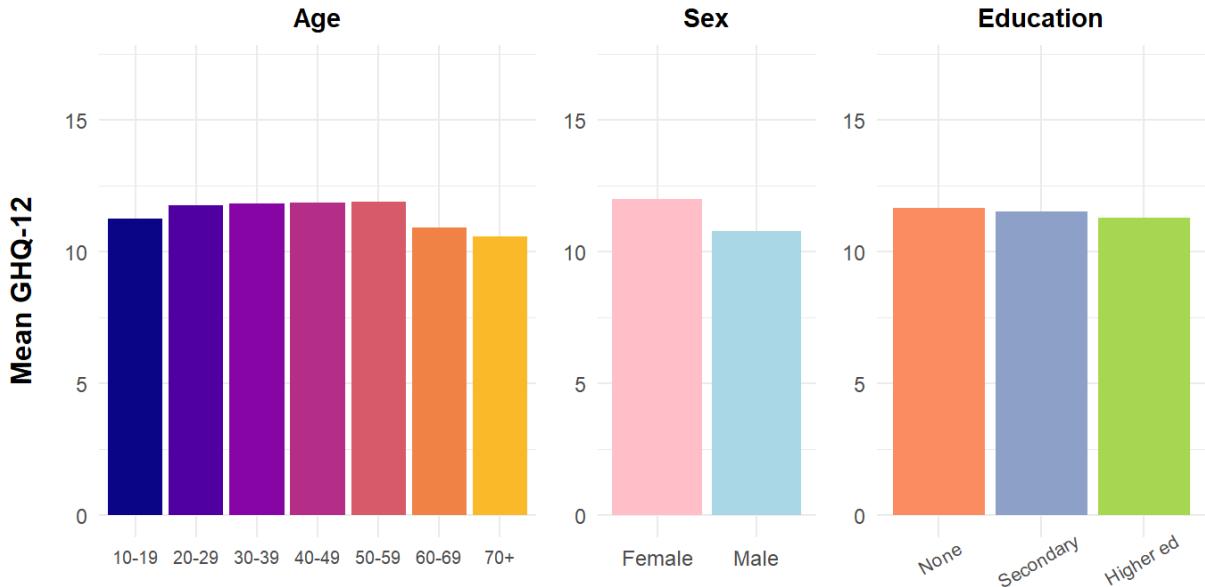
Before diving into what predicts recovery, it is insightful to understand who struggles most. Alongside physical and social factors, mental health is shaped by who we are and how strained we feel about our financial situation.

Demographics & Mental Health

There were three key patterns across the demographic variables in our data: age, sex, and education.

Mental Health Across Demographics

Average GHQ-12 scores by age, sex, and education level



Note: Higher GHQ-12 = worse mental health.

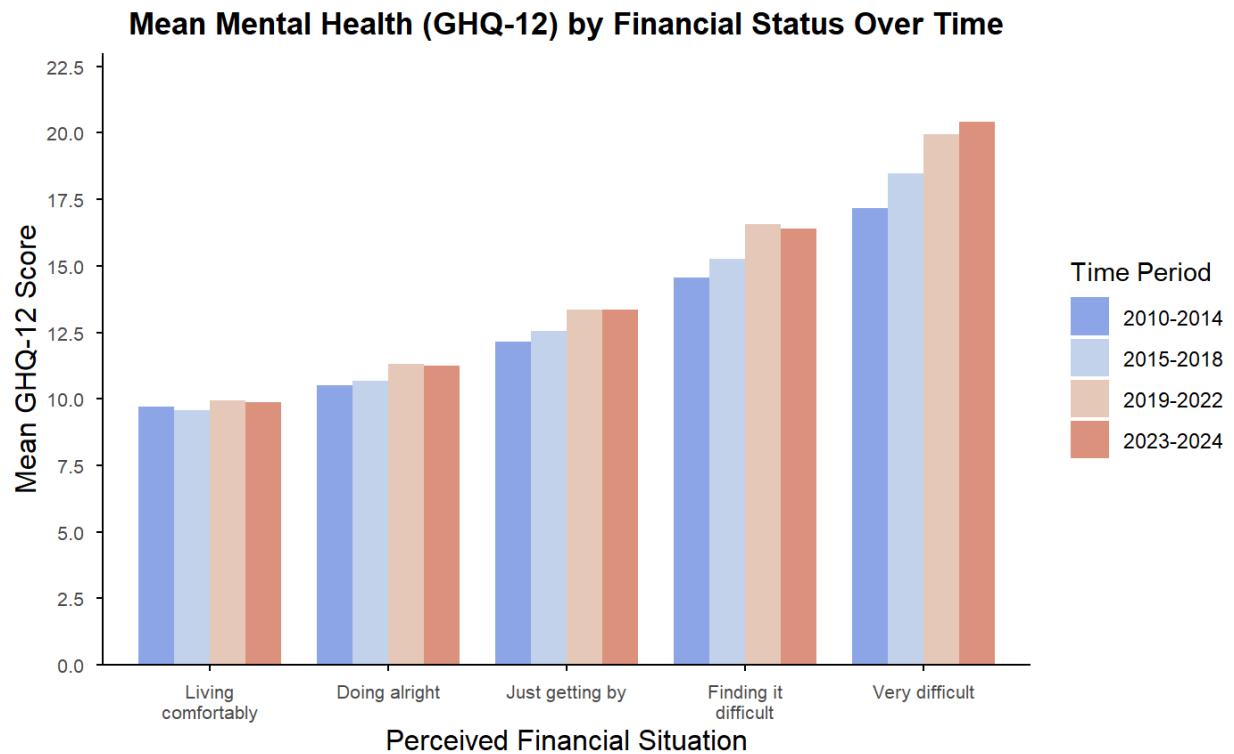
From the age plot, mean GHQ-12 scores tend to have minor increases from the 10-19 age bracket until the 50-59 age bracket. From the 60-69 age bracket onwards, there are discernable decreases in the mean GHQ-12 scores.

The sex plot indicates that the mean GHQ-12 scores for females tend to be higher than the mean GHQ-12 scores for males, aligning with broader research on gender differences in mental health.

The mean GHQ-12 scores for education showcase a gradual decrease for each level of education completed. Thus, an individual without a degree would tend to have higher GHQ-12 scores than someone who completed a degree in higher education, on average.

Financial Situation & Mental Health

Beyond demographics, one's financial situation reflects how they are dealing with their economic circumstances, including factors like the ability to afford daily necessities and manage debt. As financial security is a fundamental part of daily life, financial strain can spill over into broader well-being, making it a principal area for analysis.



This visualization compares average GHQ mental health scores across perceived financial situation levels and four time periods. A clear and consistent pattern is shown: people who report more difficult financial situations tend to have worse mental health on average, while those living more comfortably have better mental health.

Also of note, mean mental health scores increased over successive time periods, supporting the idea of a global mental health crisis emerging in recent years and signifying the need to address it.

Part 2: The Physical Well-Being

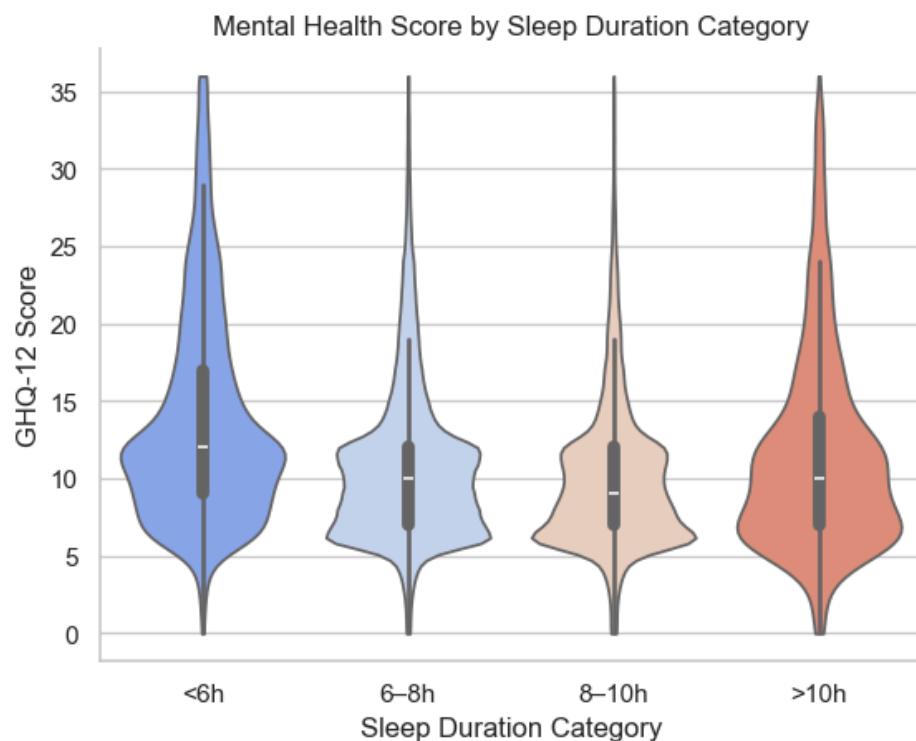
Moving on, we used a statistical technique called mixed-effects modeling—which tracks the same individuals over time while accounting for the demographic and financial factors discussed in Part 1.

By analyzing changes over two-year intervals, we can see what behaviors today predict recovery two years later—helping us determine what cultivates the ability to bounce back from the downturns of life. We defined recovery as a meaningful improvement in GHQ-12 scores over the two-year window—specifically, a drop of at least 4 points to below the clinical threshold for elevated distress.

We first created a model including sleep duration, fruit & vegetable intake, and physical activity of people with mental health struggles to understand which physical health behaviors helped predict their odds of mental health recovery in two years' time.

Sleep Duration & Mental Health

Sleep is one of the most fundamental components of daily life, and its link to mental well-being has been well-established across psychological and medical research. Therefore, it is an important factor when examining how people recover from periods of distress.

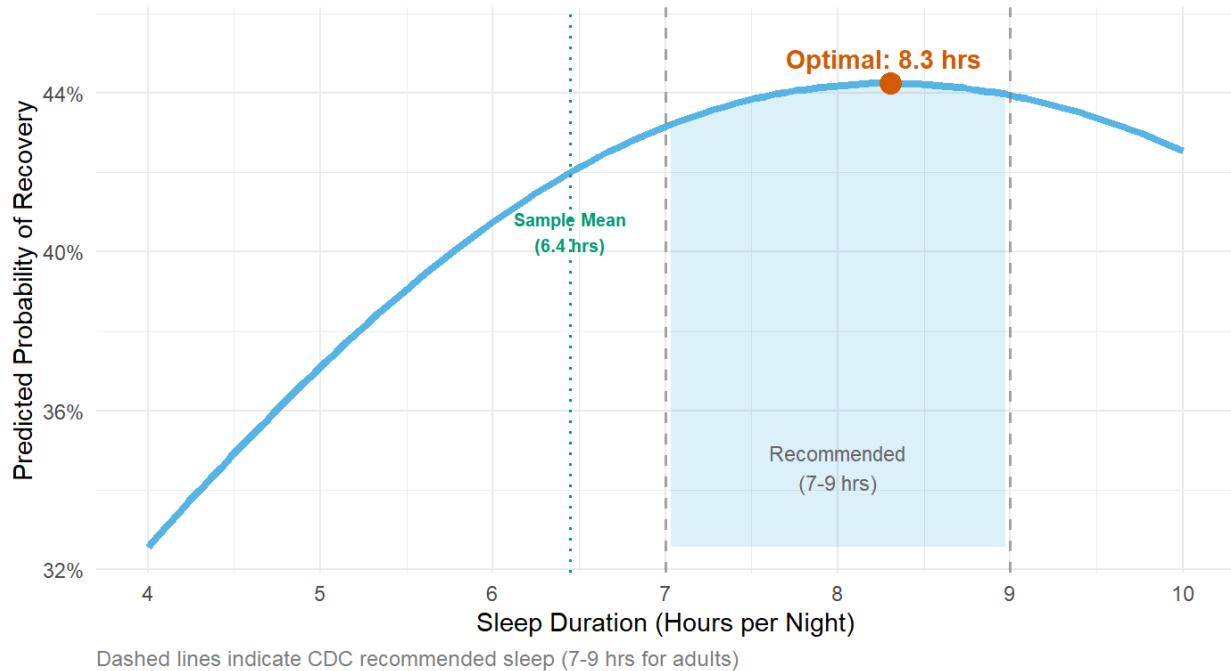


Using GHQ-12 scores as the measure of mental health, this violin plot compares four sleep duration categories to illustrate how distress levels differ across sleep patterns. Those who slept between 6-8 hours and 8-10 hours a day displayed the lowest GHQ-12 scores, while those sleeping under 6 hours showed the most elevated distribution of GHQ-12 scores.

The U-shaped pattern raised an important question: does poor sleep cause worse mental health, or does poor mental health cause poor sleep? Someone who is already depressed may struggle to sleep—making sleep look like a cause when it's actually a symptom.

The Sleep-Recovery Curve

Pooled 2-year transitions (W7→9 + W13→15) | Nonlinear relationship



Our model helps address this concern to a large degree, tracking the same individuals over two-year windows and using current sleep habits to predict future recovery. If sleep were merely a symptom, we wouldn't expect it to predict a better chance of future recovery after controlling for one's life context.

Overall, the results suggest optimal sleep duration comes at around 8 hours for roughly a 2% increase in predicted recovery odds compared to the sample average of 6.4 hours, and a 12% increase compared to 4 hours. Thus getting sleep in the CDC recommended range may forge stronger mental resilience, even if by just a bit.

Dietary Intake & Mental Health

In addition to sleep, understanding the potential relationships between diet, specifically the incorporation of fruits and vegetables, and mental health is significant, as it would link another changeable behavior to psychological wellbeing.

Diet & Mental Health Recovery

Vegetable intake significantly predicts recovery; fruit shows weaker trend



This visualization shows a consistent positive association between vegetable consumption frequency and their predicted probability of mental health recovery, while being more ambivalent on fruits. Across the categories, the higher vegetable intake is consistently associated with a higher predicted mental health recovery probability, while fruit intake follows a similar but weaker relationship.

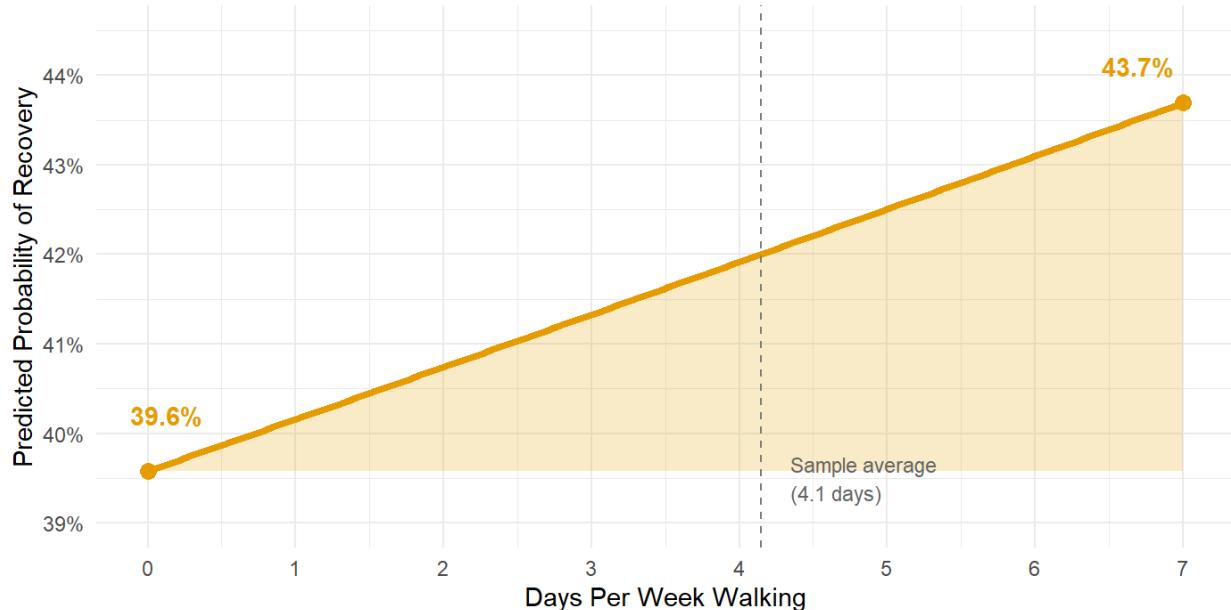
Overall, these results largely align with studies that suggest diets that are rich in fruits and vegetables provide essential nutrients to support neurological functions and subsequently support mental well-being to a degree.

Physical Activity & Mental Health

Finally, the last variables of interest we evaluated for our physical health model were related to physical activity. When we think of exercising for mental health, we often picture high-intensity activities like running or heavy gym sessions. However, our model revealed a surprising nuance.

Walking & Mental Health Recovery

Daily walkers have ~4 percentage points higher recovery probability than non-walkers



Note: Moderate and vigorous exercise were also tested but showed no significant effect.

Among people already struggling, walking—the most accessible form of movement—predicted modest but statistically significant increases in recovery odds, while moderate and vigorous exercise did not do so significantly.

These findings may seem to contradict intervention studies suggesting the most intense interventions of exercise benefit mental health most. However, this doesn't mean intensive exercise would not improve mental health—it may simply be harder to sustain when you're already struggling.

Thus, the best exercise for mental health recovery may come from starting smaller and practicing what you will be able to maintain over time, such as walking.

Part 3: The Social Circle

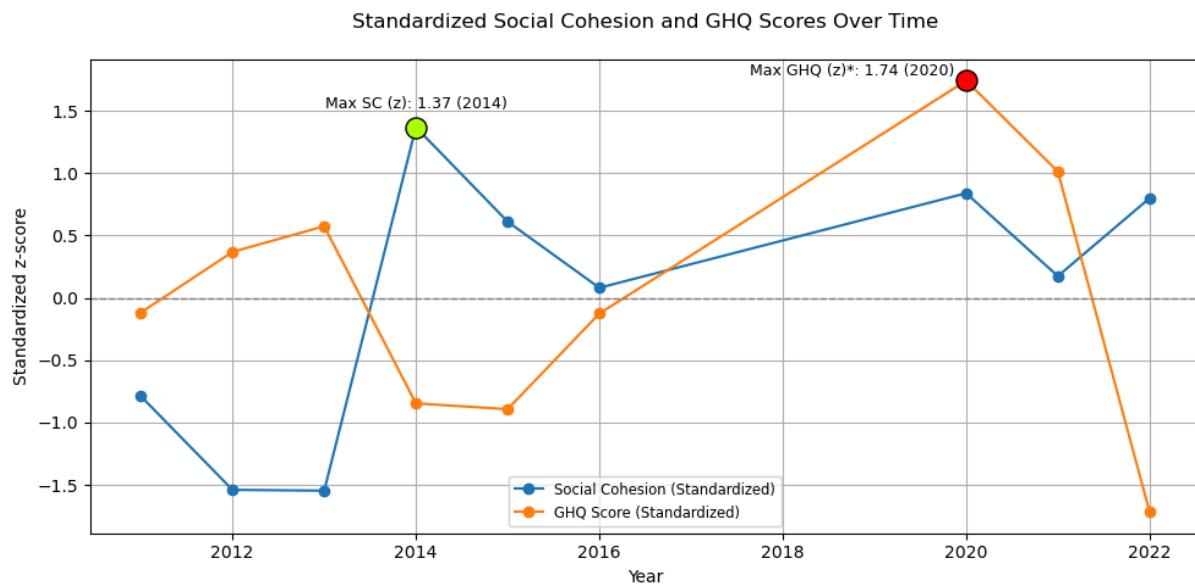
Finally, the people we interact with are indispensably crucial in shaping how we think and feel, whether through subtle means of lightly cheering us up in a given moment or grand proportions through shaping our entire personality over long stretches of time. Consequently, we wanted to evaluate how one's social connections predicted their mental health scores.

As in Part 2, we used mixed-effects modeling to track how social factors predict recovery over two-year intervals. We first quickly contextualize (once more) how general neighborhood bonds correlated with mental health scores in our population over time. We then created a model

including support and strain with friends, family, and romantic partners as predictors of mental health recovery to see what significantly affected the probability of such recovery in the future.

Neighborhood Bonds & Mental Health

As opposed to more intimate relationships with friends and family, social cohesion reflects the degree to which individuals feel connected to, supported by, and integrated into their immediate neighborhood. We hypothesized that higher social cohesion would reduce the risk of mental health difficulties because socializing is so important to who we are as human beings.



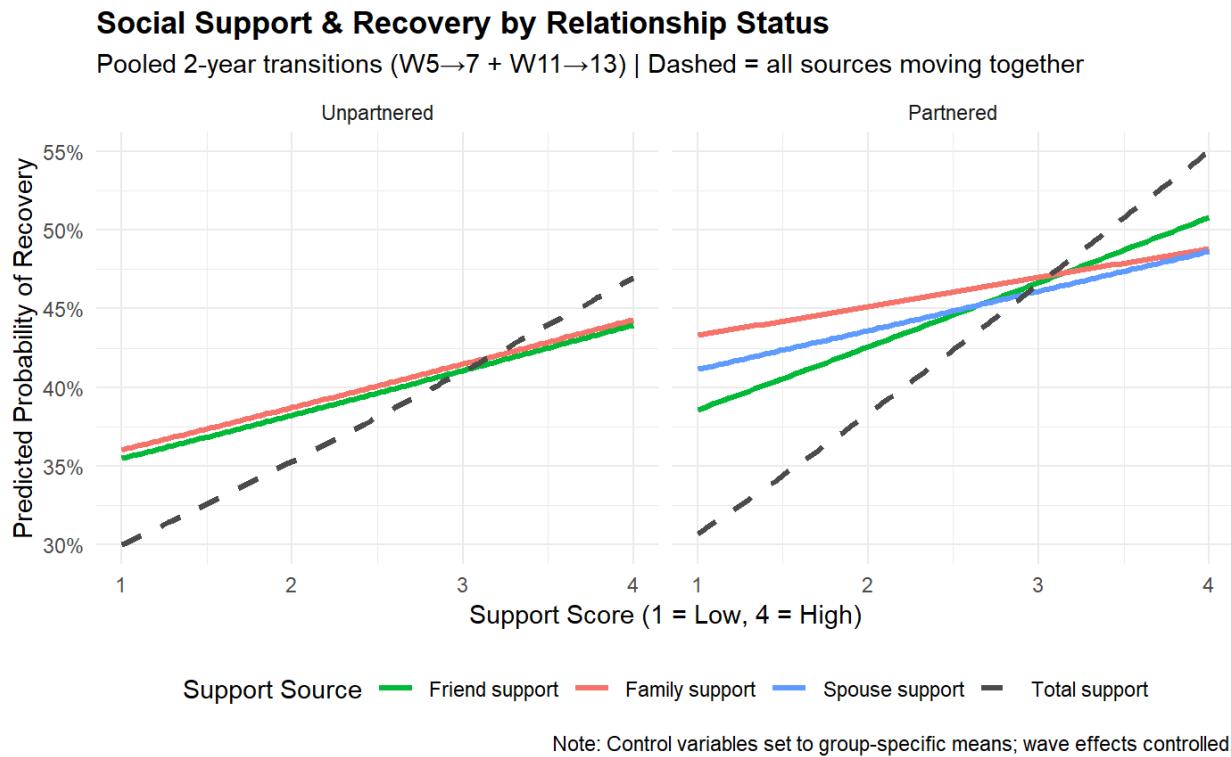
To roughly gauge their relationship, we visualized standardized population means for both social cohesion and GHQ mental health scores across the years from 2011 to 2022. Overall, the figure reveals that the two variables tend to move in opposite directions across time.

Though we were not able to incorporate this variable in our model due to dataset limitations, the data provides suggestive background evidence that neighborhood bonds may play a role in mental well-being. We include this descriptive finding because it aligns with the broader view that neighborhood bonds are linked to mental well-being, even though our models focus on individual relationships.

Close Relationships & Mental Health

Beyond smaller connections to those in your community, the most important people in our lives can generally be categorized into friends, family, and romantic partners. Presumably, the support of these people is important in helping those with poor mental health recover from such distress, and strain with them would decrease odds of recovery.

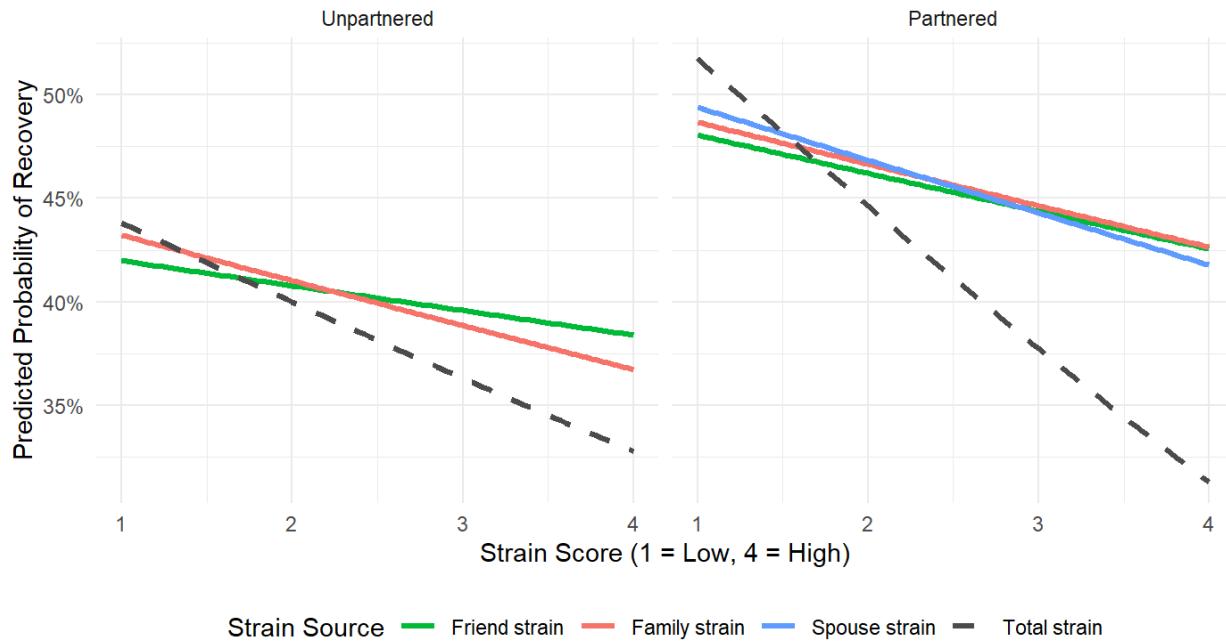
To test this hypothesis, we computed levels of social support received from these three types of people from a UKHLS subject's answers on how much they can rely on and talk to them. We also measured social strain—the degree of criticism, conflict, and demands experienced from these same relationships.



The model suggests that all types of social support are associated with better chances of escaping poor mental health in the future. For partnered individuals, the benefits appear to stack—someone with high support from all sources has roughly a 55% predicted recovery probability, compared to 31% for someone with uniformly low support. Those without partners show a similar but weaker pattern, suggesting partner support provides an additional layer of mental health benefits that friends and family alone may not fully replace.

Social Strain & Recovery by Relationship Status

Pooled 2-year transitions (W5→7 + W11→13) | Dashed = all sources moving together



Relationship strain tells the opposite story. For partnered individuals, high strain across all sources drops predicted recovery from around 52% to 31%. Unpartnered individuals show a smaller decline (44% to 33%). This suggests that while having a partner provides additional support, conflict with a partner may be particularly harmful to mental health recovery. And comparatively, strain with friends is especially less damaging, presumably because they would be easier to distance oneself from.

Conclusion

[For readers starting here: this section summarizes findings from our analysis of 13,000+ U.K. adults tracked over multiple years.]

In closing, we discovered how everyday aspects of life are closely tied to mental health recovery.

Physical health behaviors such as getting optimal sleep (around 7-9 hours nightly), eating vegetables (& maybe fruits) regularly, and staying lightly active through walking are meaningful predictors of who is more likely to rebound from psychological distress. Interestingly, more intense forms of exercise did not show significant effects—likely because they are harder to sustain when already struggling.

Beyond individual habits, social connections also play a crucial role. Strong, supportive relationships with family, friends, and life partners all independently predicted better mental

health outcomes, and the benefits appear to stack when support comes from multiple sources. Equally important, relationship strain—particularly with partners and family—predicted worse outcomes, suggesting that the quality of our relationships matters as much as their presence.

At the same time, our models show that certain levels of sleep, exercise, and social support predict recovery—but they do not directly test whether changing these behaviors leads to improvement, so we cannot definitively say that they cause it. Still, a key strength of our findings is that they capture what behaviors naturally distinguish people who recover from those who do not. This matters because the behaviors that predicted recovery tend to be sustainable: walking over intense exercise, nurturing existing relationships. The most effective intervention is of little use if someone who is struggling cannot actually do it.

Overall, our results suggest that recovery is shaped by the major facets of our daily lives—what we do at home, how we take care of our bodies, and how we spend time with others. Aiming for more consistent sleep, adding an extra serving of vegetables, choosing gentle movement like walking, and nurturing low-conflict relationships are not cures on their own. But they may help create conditions that make recovery more possible over time.

If you know someone who is struggling mentally, offering patience, presence, and support rather than solutions can go a long way. And just as importantly, remembering to extend that same care toward yourself matters too. If you’re struggling, opening up to someone you trust—even a little—may help more than you expect.

References

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