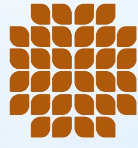

SIERRA TUCSON®

Where Change Begins®

OUTCOMES ANNUAL REPORT

2023

PREPARED BY

Alex Danvers, PhD

Director of Treatment Outcomes

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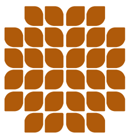

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WHAT'S NEW IN OUTCOMES

Sierra Tucson is a world class mental health organization. How do we make sure we are staying at the top of our game? By using data! Our extensive treatment outcomes program allows us to know our care changes lives. This helps us plan out the best course of treatment for our residents, and to find new ways to improve our care.

2023 was my first full year as Director of Treatment Outcomes at Sierra Tucson, and I was very happy to see our outcomes program continue to thrive. When I first arrived in August 2022, I found a robust program for tracking patient progress and getting comprehensive insights to everyone who comes to our residential treatment facility. I also found that, as advertised, treatment at Sierra Tucson was very effective! There are large and consistent improvements in treatment outcomes for residents. This year we continued to provide comprehensive insights on patients, and saw big gains in mental health and psychological functioning while people are with us.

WHAT'S NEW IN OUTCOMES

We're always looking for ways to improve our processes. This year there were a few big changes that really improved our care. Here are the new developments in our outcomes program in 2023:

WE MOVED FROM HAVING JUST PRE- AND MID-TREATMENT ASSESSMENTS TO HAVING ASSESSMENTS EVERY 2 WEEKS DURING A PERSON'S ENTIRE RESIDENTIAL STAY.

- More assessments allow us to capture change at the end of treatment, giving us better insight into the effects of treatment at Sierra Tucson.
- More assessments also allow us to better monitor and adjust our treatment for those who have longer stays.

WE INTRODUCED A BRIEF PATIENT REPORT THAT IS PHYSICALLY HANDED TO THERAPISTS AND MEDICAL PROVIDERS WITHIN 24 HOURS OF AN INDIVIDUAL COMPLETING THEIR ASSESSMENT.

- This brief report communicates key information from tests to clinicians quickly and in an easy-to-digest format, so they have new information as soon as possible.

WE INTRODUCED AN OUTCOMES SECTION ON THE SIERRA TUCSON WEBSITE.

- Quarterly Treatment Outcomes are online, so our latest info is always available.
- Specific outcomes related to our different programs are also available.
- Find us at www.sierratucson.com/about/outcomes

Lastly, we're using this new report format for our annual outcomes! As someone who has worked with psychology data for over a decade, I know that great analysis doesn't go anywhere without clear communication. I hope that this new format helps make our work on treatment outcomes easier to understand and digest, so that you know what we're doing here at ST-and why we're so proud of our outcomes!

Thanks for taking a look.

Alex Danvers, PhD
Director of Treatment Outcomes

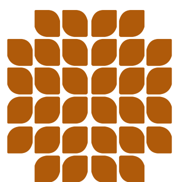
ABOUT US

Sierra Tucson is a world class residential mental health facility. In 2023, we were named Arizona's Best Addiction Treatment Center by Newsweek. As part of our commitment to excellence, we assess progress and treatment outcomes for all patients. This allows us to better understand our strengths, and to find areas where we can continue to grow.

The Sierra Tucson Measurement Based Care (MBC) program tracks patient progress throughout each person's stay at our residential mental health facility. After patients leave Sierra Tucson, they are invited to continue to stay in contact with us through the Connect 365 program. By combining the information we gain from patients while they are here in residential treatment with the information we collect for a full year after patients have left, we can understand the trajectory of a person's mental health journey over time.

This report contains a summary of our treatment outcomes from 2023. Mental health is complex and multi-faceted, and numbers don't always capture the complexity of an individual's progress. However, by stepping back and looking at the patterns in treatment progress, we can gain a broader understanding of how we are doing-and what you or your loved one can expect from treatment here.

Sierra Tucson also regularly conducts internal research to better understand our patients and what's working in our treatments. We are happy to present some of our findings in this report, to help the broader community gain deeper insights into mental health treatment.



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WHAT DO WE MEASURE?

When people enter residential treatment at Sierra Tucson, they are assessed using the **Comprehensive Psychological Profile.** This same set of assessments is then completed every two weeks, to see how people's mental health changes over the course of treatment.

Some of our assessments look at mental health symptoms and disorders. Here's what we measure:

DEPRESSION	**ANXIETY**	**PTSD**
SLEEP DISTURBANCE	**PAIN INTERFERENCE**	**STRESS**

We also measure cravings for substances over time. Cravings are assessed on a scale of 0 to 10. Here are the substances we ask about:

ALCOHOL	**MARIJUANA**	**COCAINE**
SEDATIVES	**PAINKILLERS**	**STIMULANTS**
HALLUCINOGENS	**CLUB DRUGS**	**METHAMPHETAMINE**
INHALANTS		**HEROIN**

WHAT DO WE MEASURE?

Other assessments look at general indicators of psychological functioning. These are areas that don't come with a diagnosis, but where we would like to see progress. Here's what we measure:

THE CONNECT 365 PROGRAM

All Sierra Tucson patients are eligible for one free year of our Connect 365 program. Connect 365 connects alumni of our programs with certified recovery coaches. These recovery coaches help people connect with resources out in the community, and they provide someone to listen and talk through problems with. They also ask patients a handful of questions about their treatment progress at regular intervals, so that we know how people are doing.

We ask seven questions about treatment progress. These are modified versions of questions used in the National Outcome Measures (NOMS) from the Substance Abuse and Mental Health Services Administration (SAMHSA).

THE CONNECT 365 PROGRAM

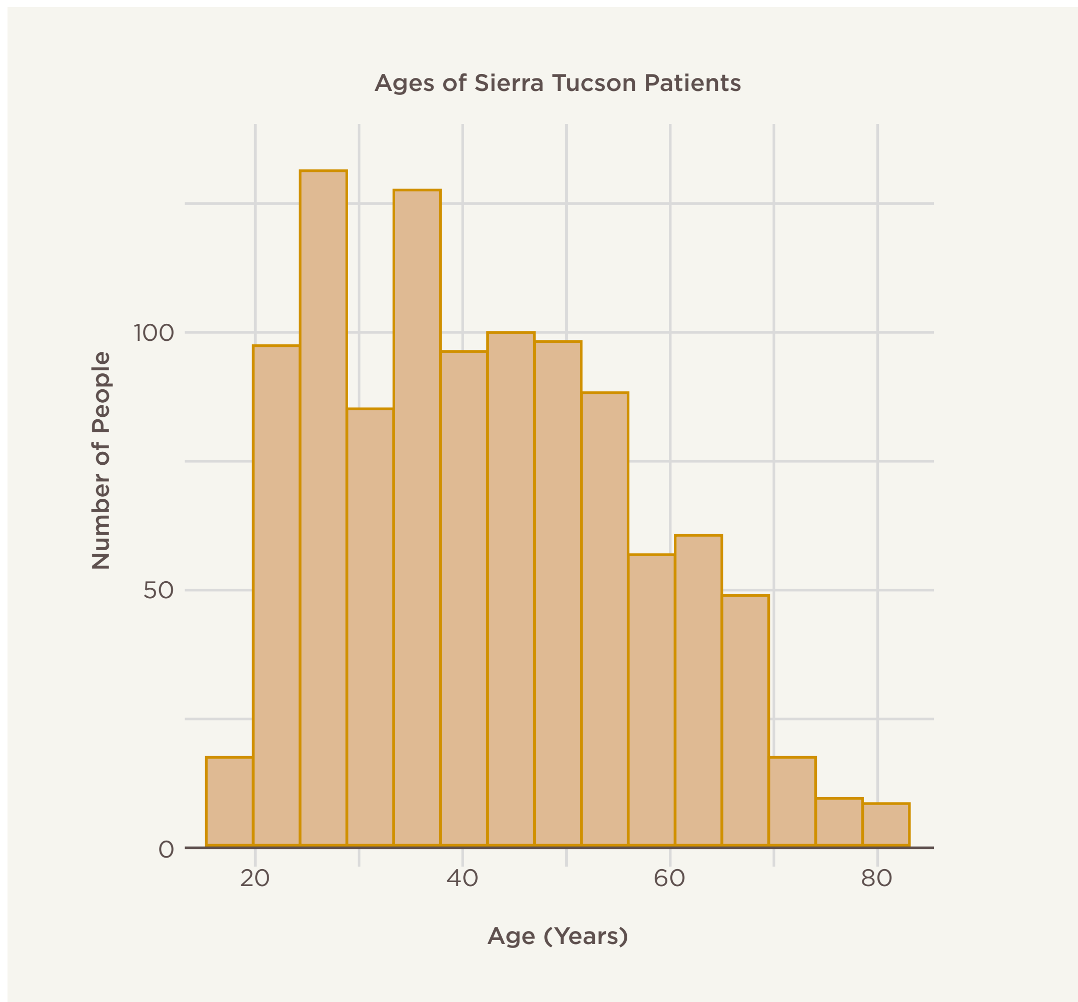
Three questions ask patients to report on their subjective experiences. These assess. These are listed in the "Subjective Report" column.

Four questions ask participants to report how many days, out of the last 30, the following have occurred. These are listed on the "Objective Report" column.

SUBJECTIVE REPORT	OBJECTIVE REPORT
Ability to Handle Stress	Days Needing Hospital/ER Treatment
Satisfaction with Relationships	Days Paid for Work
Overall Quality of Life	Days Attending Support Groups
	Days Using Substances

OUR PATIENTS

In 2023, we collected data on 1141 patients through the Measurement Based Care (MBC) program. This was the data used to assess change during the course of treatment. Our patients ranged from 19 to 81 years old, with an average age of 42. The number of people in each age group and the gender proportions are given below.



GENDER	♀ FEMALE	♂ MALE	NON-BINARY	NOT SPECIFIED
PERCENT	44%	52%	2%	2%

CHANGES WHILE IN TREATMENT

We used the MBC data to measure change while patients were in treatment. We observed changes in three areas: Mental Health Symptoms, Cravings for Substances, and Positive Indicators of Psychological Functioning. Results for each are given as a table, which provides details of the statistical tests we conducted, and as a figure.

Methods Note

In creating these analyses, all assessment scores were rescaled to be on a 0 to 100 scale. As clinicians and researchers quickly learn, many assessments have different scoring systems. One scale might run from 0 to 21, another from 0 to 80, and another from 1 to 5. What is presented here is a Percentage of Maximum Possible (POMP) score, which is often used by researchers to allow for quick, simple comparisons of scores across scales.

Statistical significance tests were run for all changes. These test whether changes in a score over time is reliably different from zero-in other words, would we expect to see the same direction of change if we collect many similar samples on patients who went through treatment at Sierra Tucson. If the test was statistically significant, it indicates the change is likely to be reliable.

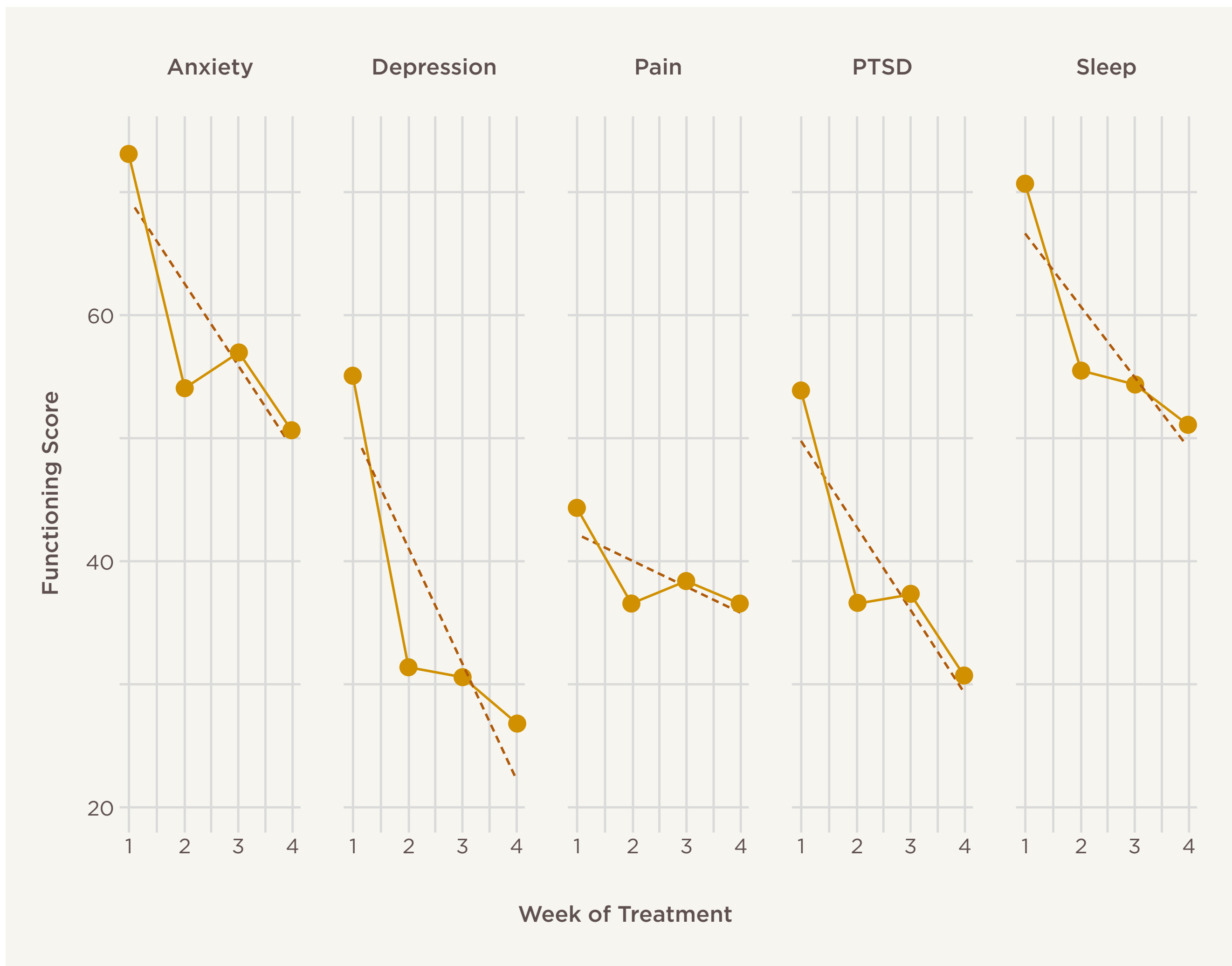
One more technical detail on the statistical tests: change was measured for all patients using hierarchical linear modeling, with number of days in treatment as a predictor of the assessment score. This means the tests were of how big a change we would expect per day, on average. To figure out what we'd expect over a full, month-long stay, we can multiply that number by 30. That gives us a sense of the overall amount of change to expect over the course of a stay

CHANGES IN MENTAL HEALTH SYMPTOMS

There were large, statistically significant decreases in all mental health symptoms across people's stays at Sierra Tucson. From the graph (on the next page), we can see that the largest decreases in all symptoms occurred from the first to the second measurement. This suggests that people experienced a strong stabilizing effect of starting residential treatment at Sierra Tucson. After this stabilizing, residents continued to make progress, but this came at a slightly slower rate. This is consistent with a therapeutic process that requires some work from patients in identifying issues, processing experiences, and finding new skills for dealing with them.

Measure	Change per Day	df	t statistic	p-value	Expected 30-day Change
CESD DEPRESSION	-1.19	1429.08	-31.49	<.001	-36
PROMIS ANXIETY	-0.84	1416.25	-25.32	<.001	-25
PTSD PCL-5	-0.86	1552.21	-21.23	<.001	-26
PROMIS PAIN	-0.32	1305.12	-9.68	<.001	-10
PROMIS SLEEP	-0.73	1543.08	-19.94	<.001	-22

CHANGES IN MENTAL HEALTH SYMPTOMS



The graph also makes it clear that the largest improvement is in depression. On average, patient depression scores decline by over 50%. The data therefore show that treating depression is an area of strength for Sierra Tucson.

On the other side, the smallest declines came in treating chronic pain. There were still significant decreases in chronic pain scores, the gains just weren't as large as in other areas. Sierra Tucson is already acting to improve outcomes for chronic pain. In 2024, we introduced Pain Reprocessing Therapy (PRT) to residents, a rigorously studied and empirically supported therapy that helps people reduce chronic pain.

CHANGES IN CRAVINGS

There were large, statistically significant decreases in all mental health symptoms across people's stays at Sierra Tucson. From the graph, we can see that the largest decreases in all symptoms occurred from the first to the second measurement. This suggests that people experienced a strong stabilizing effect of starting residential treatment at Sierra Tucson. After this stabilizing, residents continued to make progress, but this came at a slightly slower rate. This is consistent with a therapeutic process that requires some work from patients in identifying issues, processing experiences, and finding new skills for dealing with them.

Note:

When analyzing changes in cravings, we only included cases where someone had some baseline level of craving for that substance when they entered treatment. That means when we see a decline in craving for methamphetamines, for example, we are specifically looking at change in people who started treatment with some level of craving (anything more than zero) for methamphetamines. In other words, the methamphetamine analysis doesn't include people who came in only using painkillers and vice-versa.

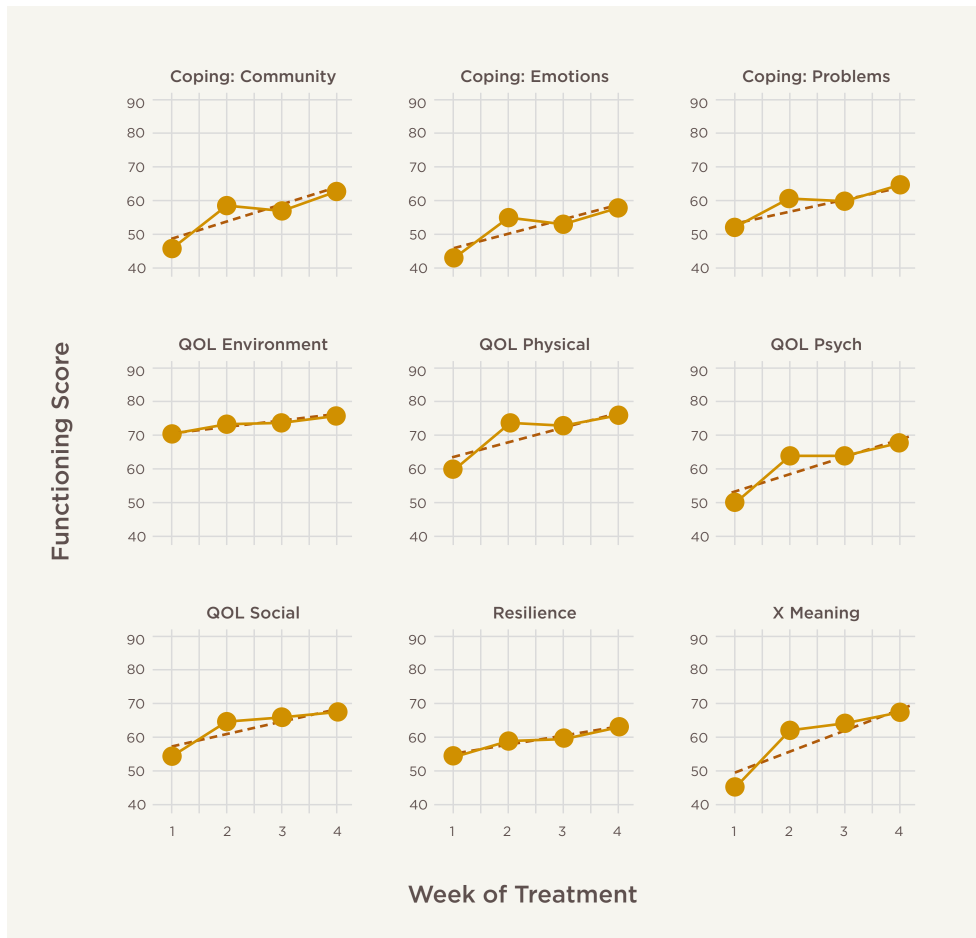
CHANGES IN CRAVINGS

Substance	Change per Day	df	t statistic	p-value	Expected 30-day Change
ALCOHOL	-1.29	1458.90	-22.49	<.001	-39
CLUB DRUGS	-0.20	1098.54	-7.13	<.001	-6
COCAINE OR CRACK	-0.54	1117.42	-11.65	<.001	-16
HALLUCINOGENS	-0.29	1187.69	-9.16	<.001	-9
HEROIN	-0.19	985.67	-5.99	<.001	-6
INHALANTS OR SOLVENTS	-0.13	1149.41	-5.25	<.001	-4
MARIJUANA	-0.96	1199.25	-17.45	<.001	-29
METHAMPHETAMINE	-0.32	1045.49	-8.50	<.001	-10
PAINKILLERS	-0.59	1131.47	-12.58	<.001	-18
SEDATIVES OR TRANQUILIZERS	-0.71	1287.27	-14.67	<.001	-21
STIMULANTS	-0.50	1005.77	-10.73	<.001	-15

CHANGES IN POSITIVE FUNCTIONING

There were statistically significant increases in all indicators of positive functioning across the course of treatment. Looking at the figures, we can see that there was often the biggest jump in the first week.

For example, average physical and psychological quality of life jumped by approximately 15 points (in the 0 to 100 scale) after one week, and then slowly continued to increase over time. This suggests that people had a good response to being in a new, stable environment at Sierra Tucson. As they "dug in" more deeply to treatment, change continued, but at a slightly slower pace.



CHANGES IN POSITIVE FUNCTIONING

Measure	Change per Day	df	t statistic	p-value	Expected 30-day Change
COPING: COMMUNITY	0.68	1327.48	21.31	<.001	21
COPING: PROBLEM	0.60	1319.07	20.69	<.001	18
COPING: SOCIAL	0.67	1351.41	19.08	<.001	20
QOL: ENVIRONMENTAL	0.22	1440.69	9.04	<.001	7
QOL: PHYSICAL	0.69	1455.28	26.86	<.001	21
QOL: PSYCHOLOGICAL	0.80	1399.13	30.03	<.001	24
QOL: SOCIAL	0.55	1497.85	18.47	<.001	16
RESILIENCE	0.40	1301.89	15.49	<.001	12
X MEANING	0.98	1383.32	22.93	<.001	30

QOL stands for Quality of Life. X Meaning stands for Existential Meaning.

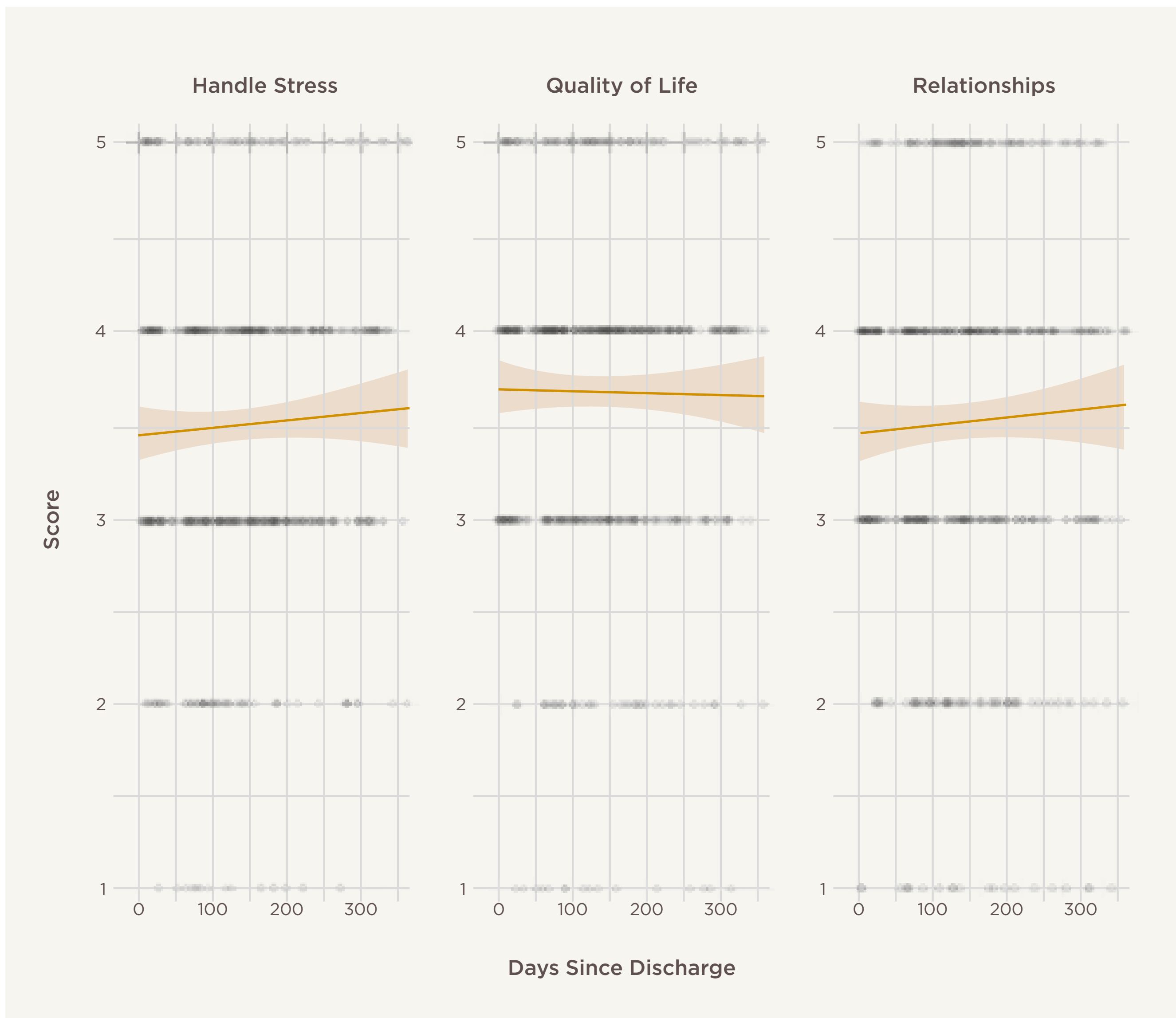
CHANGES AFTER LEAVING TREATMENT

The Connect 365 Program allows us to collect follow-up data on patients for the first year after they leave treatment. We used the same analysis strategy for analyzing change over time as above, when we were analyzing change within Sierra Tucson. The major difference is interpretation. While people are receiving treatment, we hope that their symptom scores are falling. After people leave treatment, we hope that they maintain the gains they made in treatment. This means that a flat line — and a statistical test that is not significant — are good. They indicate no steady change after people left treatment, meaning gains were maintained.

CHANGES IN SUBJECTIVE RATINGS

Measure	Change per Day	df	t statistic	p-value
QUALITY OF LIFE	0.00	452.34	0.25	0.802
RELATIONSHIPS	0.01	462.13	1.62	0.107
HANDLING STRESS	0.00	458.27	1.02	0.307

CHANGES IN SUBJECTIVE RATING



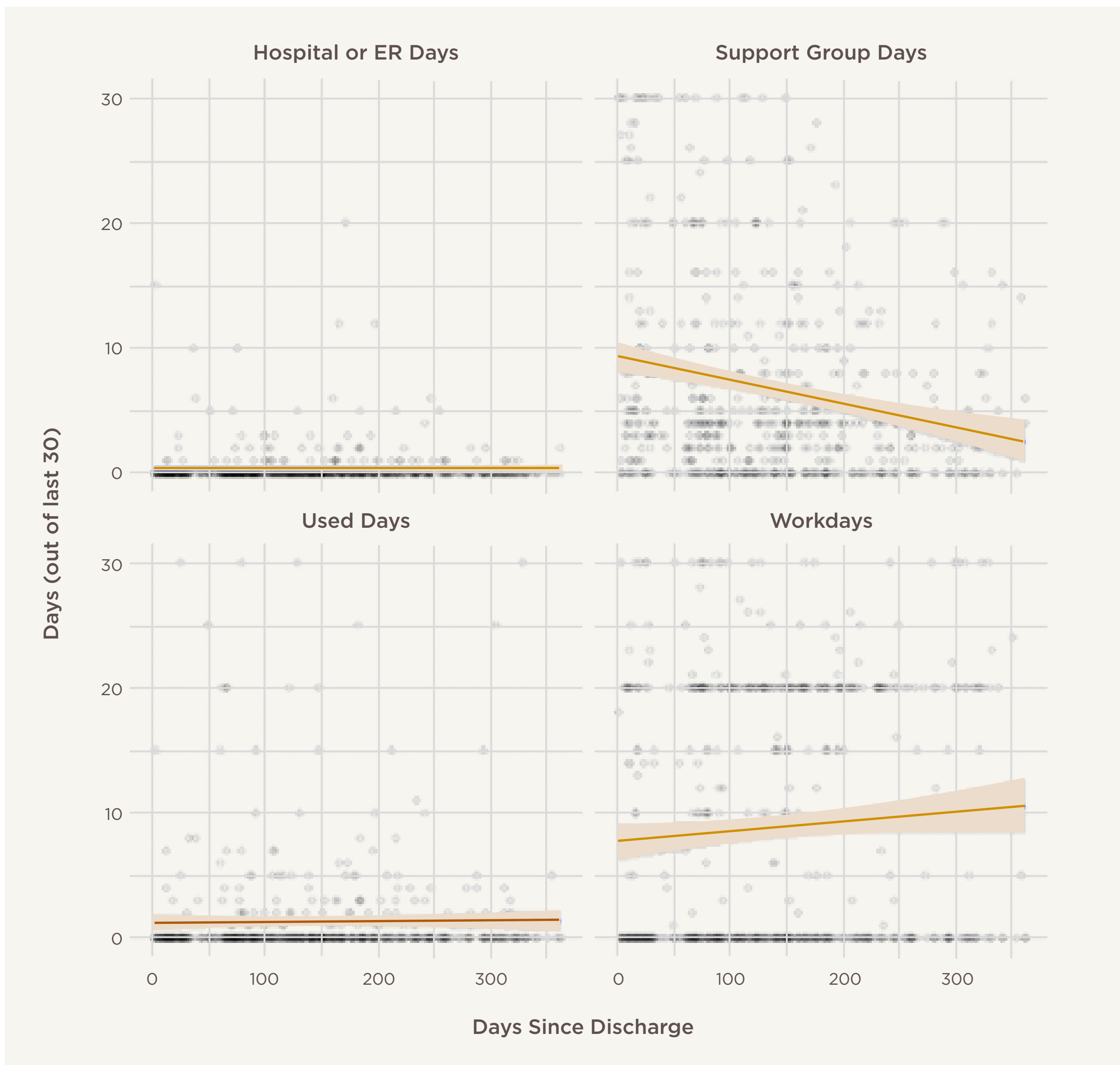
Analysis of the subjective changes after treatment indicate that **gains are maintained**. As we can see in the table, the expected daily change is approximately zero for people's ratings of their overall quality of life, the strength of their important relationships, and their ability to handle stress, The figures show that ratings of all these qualities are slightly above average (around 3.5) when people leave treatment, and stay approximately the same over the next year.

CHANGES IN OBJECTIVE RATINGS

After leaving treatment at Sierra Tucson, people reported **maintaining treatment gains** on substance use and frequency of needing hospital or ER visits. These numbers were low after treatment, and stayed low for the next year. On the other hand, people did report attending support groups for fewer days the longer they were out of treatment. This suggests that people drop off from support groups the longer they have been out of treatment. On the other hand, there was a positive trend in terms on number of days worked per month. The longer people were out of treatment, the more days they worked. This likely reflects a common move from part-time employment right after treatment to full-time employment later on in the first year after leaving treatment.

Measure	Change per Day	df	t statistic	p-value
USED SUBSTANCE DAYS	0.01	455.99	0.91	0.363
SUPPORT GROUP DAYS	-0.17	485.12	-5.51	0.000
HOSPITAL/ER DAYS	0.00	570.06	0.03	0.976
WORK DAYS	0.08	460.71	2.03	0.043

CHANGES IN OBJECTIVE RATINGS



In the figure above, each point represents a rating of how many days, out of the last 30, a person did the specific activity.

RESEARCH INSIGHT: ATTACHMENT STYLE IN MENTAL HEALTH

How we relate to our close friends, family, and romantic partners is a key element of mental health. One of the best studied ways of understanding mental health is through the lens of Attachment Theory. Attachment Theory was first developed by researchers looking at how parents and children bond, but psychologists have since found that some of the same patterns of connection also apply to adult relationships. Patterns of interaction created in close relationships can be categorized into attachment styles that describe the way you tend to connect with others.

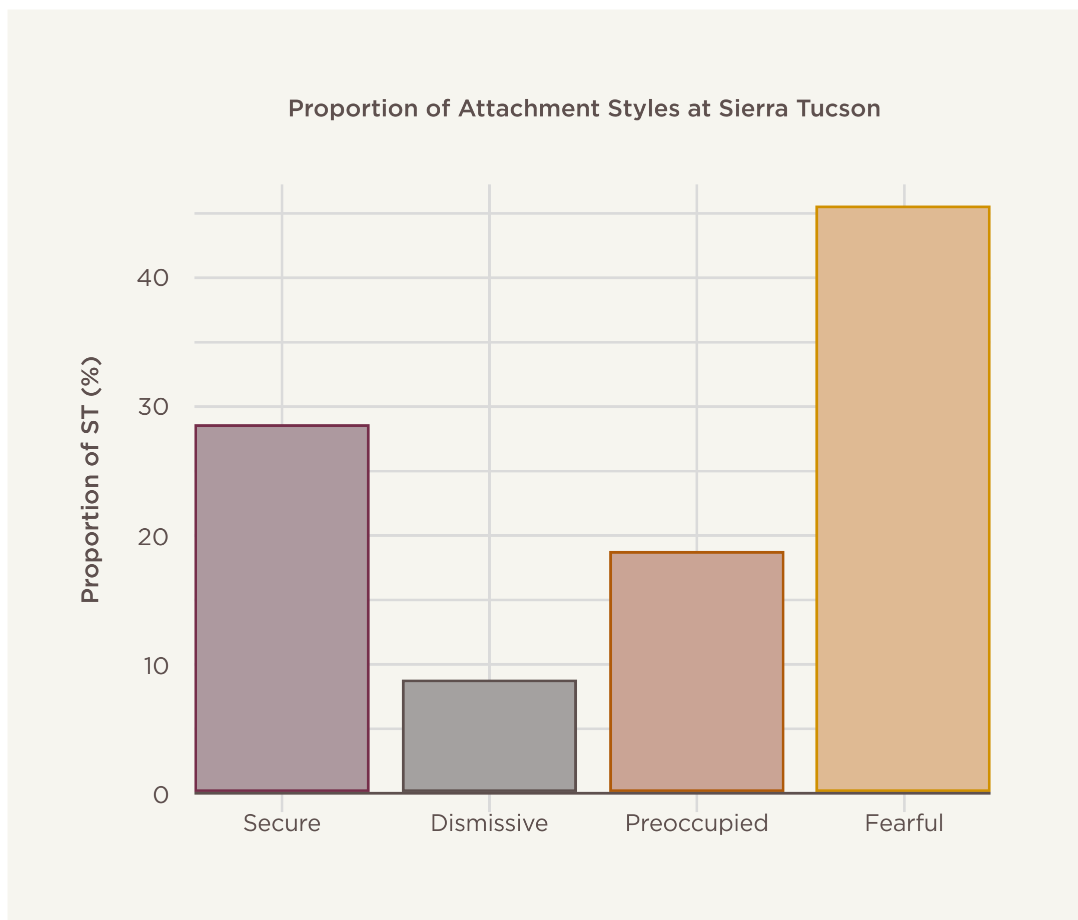
Modern research finds that there are two fundamental dimensions underlying attachment style. The first dimension is attachment anxiety. People high in attachment anxiety tend to be anxious about the other person in a relationship not being available. They often feel like other people won't get as close as they'd like. People who are low in this dimension tend to trust that other people will be available when they need them.

The other dimension is attachment avoidance. In the Revised Adult Attachment Scale (RAAS), which we use in our Measurement Based Care program, this is estimated by looking at how comfortable people are depending on others and how comfortable people are feeling close to others. Someone high in avoidance tends to not feel comfortable depending on or being close to others. They are likely to be more distrustful of other people, and to want to feel more independent and like they have their own space. Someone lower in attachment avoidance tend to be more comfortable relying on other people.

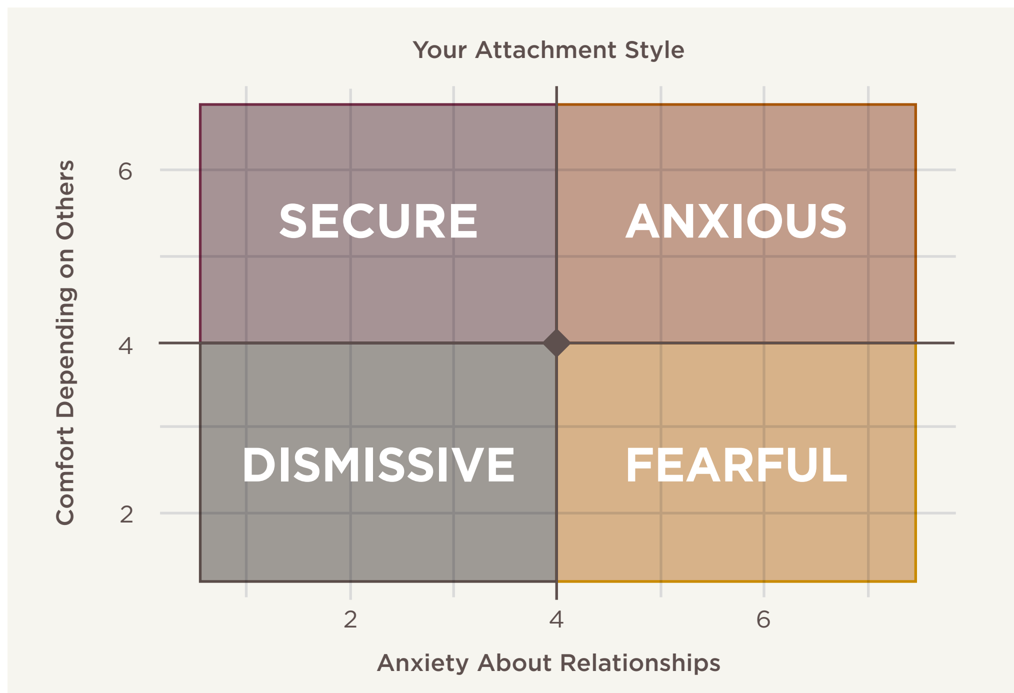
At Sierra Tucson, we have been measuring attachment styles for several years. At the same time, researchers and clinicians have been increasingly realizing that attachment is an important part of mental health. For instance, Dr. Gabor Mate has written about how patients he saw with substance abuse or addiction often seemed to use drugs or alcohol to compensate for not getting their attachment needs met. In other words, people sometimes turn to drugs when they aren't able to create deep, satisfying relationships. I conducted a few analyses to better understand this relationship at Sierra Tucson.

ANALYSIS: WHICH ATTACHMENT STYLES DO OUR PATIENTS HAVE?

In our sample, the most common attachment style was fearful (45%). This has been described as a "disorganized" attachment style, because it involved being high on both attachment anxiety and attachment avoidance. People with this attachment style can feel pushed in two directions in close relationships: they want to be reassured the other person cares about them and worry about being abandoned, but they also don't feel comfortable being close or depending on others-often because they don't really trust other people.



ANALYSIS: WHICH ATTACHMENT STYLES DO OUR PATIENTS HAVE?



In large samples of adults, this attachment style is relatively uncommon. Only a few percent of people are thought to have it. However, we see that a large number of our patients have this attachment style, suggesting this type of attachment may relate to needing treatment at a residential mental health facility like Sierra Tucson. This attachment style is thought to make forming and maintaining close relationships the most difficult. Based on our data, it looks like people with this attachment style seem to struggle a great deal with their mental health.

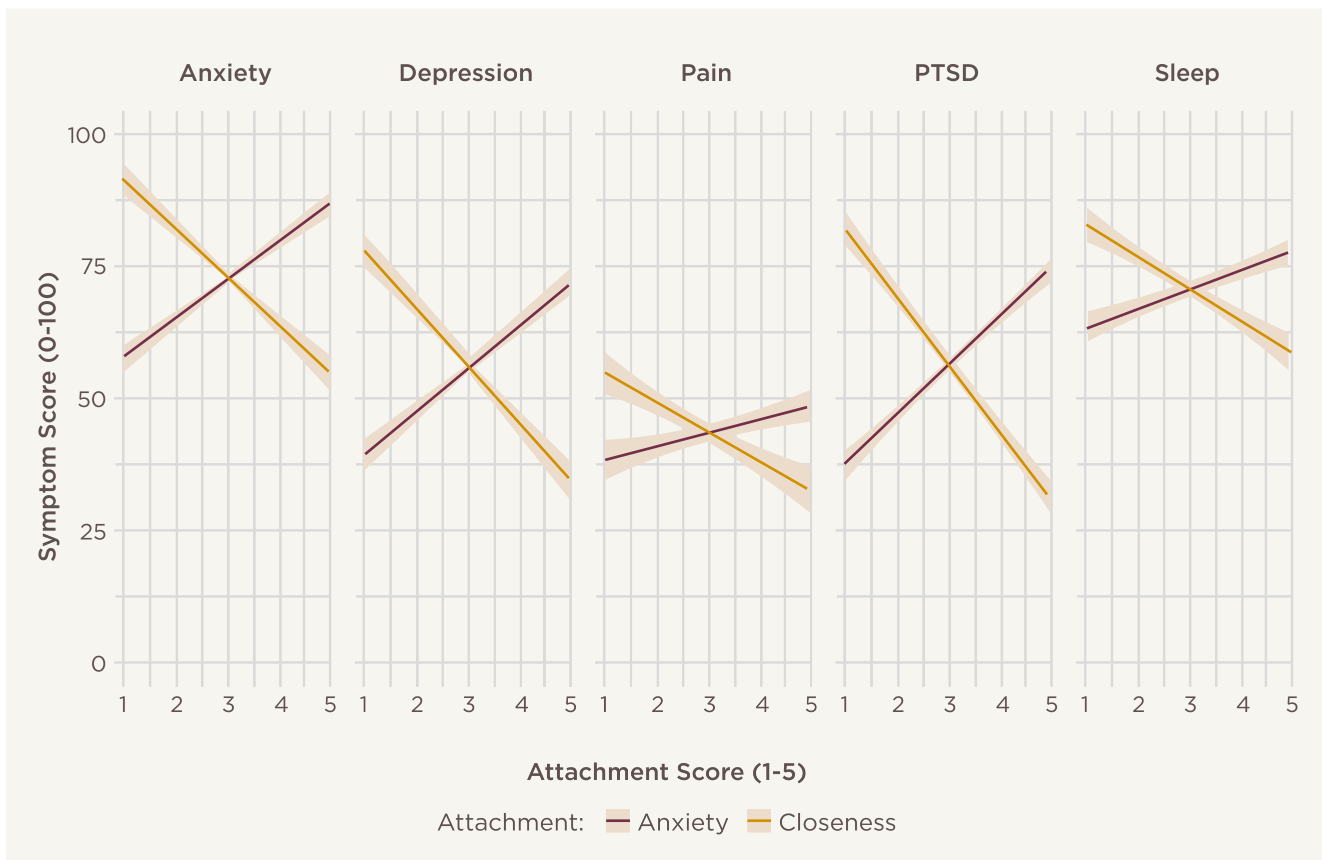
Approximately 28% of our patients entered treatment with a secure attachment style. Research on the general population finds that around 60% of adults have a secure attachment style. That means were seeing less than half as many secure people as we'd expect from the general (mostly healthy) population. This suggests that people with a healthy, secure attachment are less likely to need residential mental health treatment.

Around 19% of Sierra Tucson patients had an anxious or preoccupied attachment style. As described above, anxiously attached people tend to be worried about close others abandoning them or not being available when they are needed. This can be stressful, but the proportion of people with this attachment style at Sierra Tucson is consistent with what researchers tend to see in the general population (around 20%).

Only 8% of Sierra Tucson patients had an avoidant or dismissive style. This is substantially lower than the approximately 20% seen in the general population. Dismissive people tend not to want to rely on others for help or support. It may be that this attachment style can be protective against certain negative experiences, or that it may make people less likely to seek out help from mental health professionals overall.

ANALYSIS: HOW IS ATTACHMENT RELATED TO MENTAL HEALTH?

There were strong associations between attachment style and mental health symptoms. The general pattern was that having more attachment anxiety was related to stronger symptoms, and being more comfortable feeling close to and depending on others was related to weaker symptoms. These relationships tended to be almost exactly opposite in strength. For example depression was positively correlated r=0.40 with attachment anxiety and negatively correlated r=-0.38 with comfort with closeness and dependence on others. In the figure below, this can be seen in the "X" shape. The line representing attachment anxiety slopes up as symptoms increase, and the line representing comfort depending on others slopes down as symptoms increase.



ANALYSIS: HOW IS ATTACHMENT RELATED TO MENTAL HEALTH

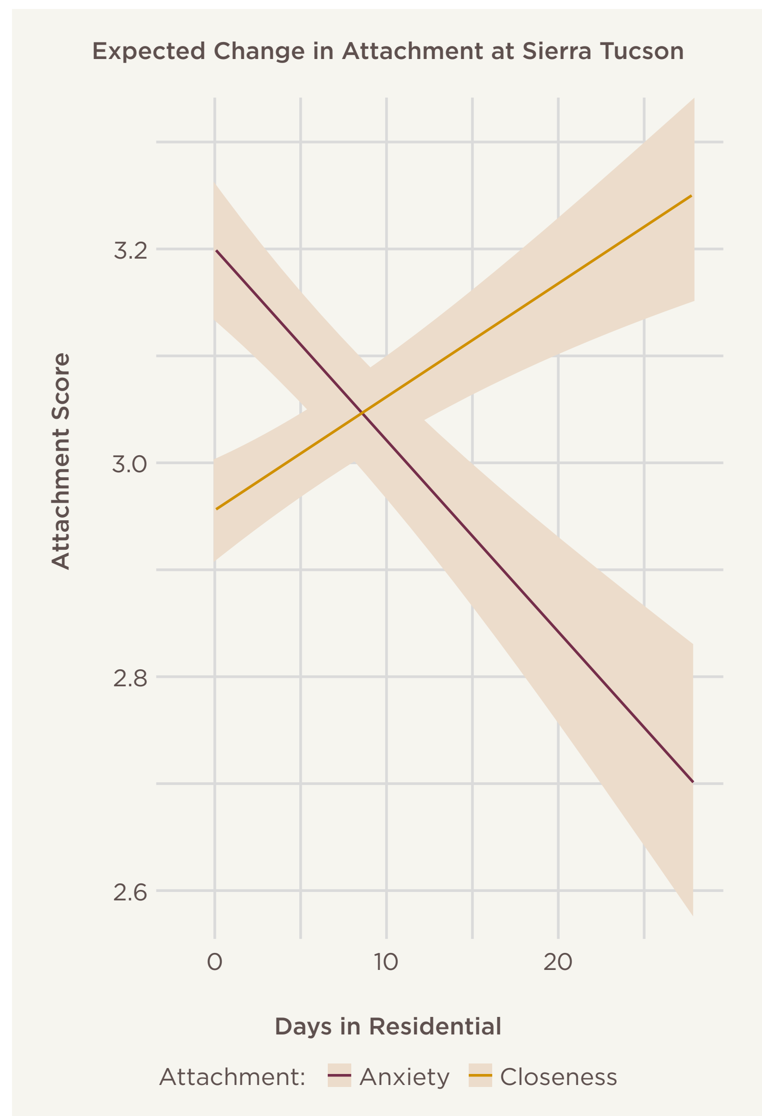
Symptom	Correlation with Attachment Anxiety	Correlation with Comfort with Closeness
ANXIETY	0.40	-0.37
DEPRESSION	0.40	-0.38
PAIN	0.11	-0.17
PTSD	0.47	-0.46
SLEEP	0.19	-0.24

Overall, attachment patterns were most closely related to PTSD scores, then depression and anxiety. Attachment patterns had weaker (but still significant) relationships with chronic pain and sleep disturbances. This suggests that difficulty forming strong, stable attachments may be a common factor underlying or reinforcing the mental health problems patients at Sierra Tucson are experiencing.

ANALYSIS: HOW DOES ATTACHMENT STYLE CHANGE DURING TREATMENT?

Changes in attachment style were analyzed using the same strategy as changes in overall symptoms and psychological functioning (see previous sections of this report). Results indicate that there is a statistically significant decrease in attachment anxiety ($b=-0.01$, $t(1313)=-9.13$, $p<.001$), and a statistically significant increase in willingness to depend on and be close to others over the course of treatment ($b=+0.01$, $t(1301)=9.06$, $p<.001$). This means that people do move towards more secure attachment patterns over the course of treatment at Sierra Tucson.

However, these changes are relatively small. This makes sense, since attachment is generally thought to be relatively stable over time. Since it comes from experiencing consistent helpful (or harmful) patterns of interaction with close others over the years, change is likely to be slow. Experiencing a positive, stable, and consistent relationship with a therapist and other care providers, however, can move people towards healthier patterns.



ATTACHMENT RECAP: WHAT WE LEARNED

There are several key takeaways from these analyses:

- Fearful or disorganized attachment styles are much more common in Sierra Tucson patients than in the general population.
- Secure attachment styles are much less common in Sierra Tucson patients than in the general population.
- Both attachment anxiety and comfort depending on and being close to others are strongly related to mental health symptoms, such as PTSD, depression, and anxiety.
- Treatment at Sierra Tucson can slowly move patients towards having stronger, more secure attachment styles with others.

These analyses underscore the importance of taking into account multiple factors when measuring psychological functioning. Going beyond symptoms and into the kinds of relationships people form can give us new insight into how to improve mental health.

CONCLUSIONS

In 2023, Sierra Tucson continued to provide excellent care. While at Sierra Tucson, patients saw large declines in anxiety, depression, and PTSD symptoms. They also saw their stress, sleep disturbances, and life disruptions from chronic pain decline. The most substantial improvement were seen in the following symptom measures:

- **Depression decreased by 67%**
- **PTSD decreased by 50%**
- **Anxiety decreased by 36%**

Patients also saw significant declines in cravings for substances while they were at Sierra Tucson. Our data show that this typically involved a quick reduction and stabilization in the first week, followed by smaller declines as people approach zero cravings. By the end of a typical month-long stay, the average craving for all substances was zero.

Sierra Tucson patients also saw reliable improvements in all the measures of positive functioning we collected. This means improvements in quality of life, coping skills, resilience, and even in feeling like there was existential meaning in their lives. The biggest improvements were seen in:

- **Finding meaning (existential beliefs) increased by 63%**
- **Psychological Quality of Life increased by 48%**
- **Confidence in Coping with Emotions increase by 47%**

After patients left treatment, they continued to maintain many of the gains they made at Sierra Tucson. For the first full year after leaving treatment, patients reported above average quality of life, relationships, and ability to handle stress. This didn't decline after leaving treatment, an indication that many of our patients were able to find new, healthy patterns in their daily lives.

In the first full year after leaving treatment, patients reported using substances on average less than one day per month. That doesn't mean that none of our alumni had periods when they used again, but it does mean that the typical response to treatment was to remain sober.

Over that period, patients also reported needing less than one day of hospital or ER care per month. While there were some cases where people needed further medical care, on average our alumni were able to avoid major medical issues. Alumni spent less days per month in support groups the farther away they got from treatment. While many people find it helpful to have a community to support their recovery after leaving treatment, not all do. Our alumni slowly drifted from these structures over time.

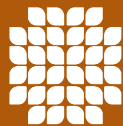
CONCLUSIONS

Finally, we found that alumni worked more days per month the longer they were out of treatment. This reflects a general trend from people to move from unemployment or part-time employment to full-time employment over the course of the first year post-treatment. This further shows that many of our alumni were able to find success in their day-to-day lives after leaving treatment.

This year, we also conducted internal research into the role of attachment styles in mental health. We found that difficulty forming secure attachments was associated with all of the mental health symptoms we assessed, especially PTSD. This suggests that difficulty connecting with others can be a common underlying problem in people struggling with poor mental health. We also found that, over the course of treatment, patients saw reliable improvements in attachment security. They became less anxious, and they became more comfortable relying on others. Psychological theory suggests that good therapy can help model healthy relationships, providing corrective experiences. This can help people regain a sense of trust in others, leading to more stable, secure relationships. Building strong, healthy relationships is the work of a lifetime, but we were happy to see that a supportive therapeutic environment at Sierra Tucson helped people change the way they viewed relationships.

At Sierra Tucson, we are always looking for ways to improve. It's nice to look back at our successes in the previous year, but we're also excited about what we've got in store for 2024. Check back with us next year to see how we're helping people on their healing journeys!

Alex Danvers, PhD
Director of Treatment Outcomes



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39580 South Lago Del Oro Parkway
Tucson, AZ 85739

www.sierratucson.com