

Neurobiology and Addiction: Assisting the Family and Support System to Get Resistant Loved Ones into Treatment

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*I drove through the neighborhood and I walked those mean streets
I begged those using buddies for the secrets they keep
And I raged out at their silence and I almost lost control
Now I question my own sanity as I search deep within my soul.
Where are our children tonight?*

From song: *Where Is My Child Tonight* by Steve Dan Mills, 2004

Living With a Stranger

Counselor: Hello, may I help you?

Family Member: Yes. I got your name from a friend who said you helped her family get their daughter into treatment. Do you do that type of work?

Counselor: Yes, we work with families and others who care about the person with a problem to form a team designed to help get an individual with an addiction problem started in treatment.

Family Member: Thank you. I have been calling everywhere and you are the first person who will actually talk with me about this. The other places only told me that they couldn't help until the person called in requesting help or they just wanted to refer me to Al-Anon.

Counselor: Please tell me about the person you are concerned about.

Family Member: I am calling about my 18-year-old son. He got arrested over the weekend for an open beer container in the car and possession of pot. This happened a week after he got suspended from school for leaving after his 1st period class with some of his loser friends.

Counselor: Have you seen any major changes in your son's behavior, attitude, school performance, and/or respect for you as parents or other changes in his relationships?

Family Member: Major changes—that's an understatement! Our son was an honor roll student in 9th grade. He played two sports and was in the school play as a freshman. He was a delight to be around. Then, in his sophomore year, he began to drink on weekends. That next summer he began to smoke pot and last year turned out to be a disaster. He totally changed. He flunked three courses, quit sports, and became an angry, belligerent kid. We don't know him any more!

Counselor: It sounds like this is not the son you raised and once knew.

Family Member: You are right. He has turned into a complete stranger. We have lost our son and we want to get him back. We're really scared about what's happening to him. We don't know him anymore.

Counselor: I understand. Your story is really typical of parents who say they are now living with a stranger. We can help you get your son back as you begin to understand what the addiction is doing to his brain and how the love and support of the family plays a most important role in getting him into treatment and supporting his recovery.

As the words in the song quoted above and the telephone dialogue of the parent talking about the stranger now living with the family so painfully describe: substance abuse and addic-

tion hijack the brain and the subsequent damage leads to increasingly intolerable circumstances. The inevitable progression of untreated addiction results in individuals becoming irrational, defiant, unpredictable, self-centered, and irresponsible. The people closest to them suffer the most hurt. These family members and concerned others are also the ones who most frequently call a treatment agency or therapist asking for assistance in getting their loved ones into treatment.

This paper explores the impact of active addiction on one area of the brain, the prefrontal cortex, as an illustration of the neurobiological effect of addiction. It describes how changes in identity of the active addict impact family and other significant relationships, leading to a perception of boundary ambiguity resulting from a situation of ambiguous loss very similar to that experienced by families dealing with Alzheimer's disease or Mild Traumatic Brain Injury (MTBI). The paper concludes with a description of an evidence-based best practice method designed to work with family members and concerned others to help get an addicted loved one (or other person not taking adequate measures to protect his or own physical or mental health) started in treatment.

The Neurobiology of Addiction

The process of change and sense of loss experienced by the parent in the above phone call is typical after the onset of addiction (Landau & Garrett, in press, 2008). The experience is real and not imagined or an over-reaction. The vast majority of parents and spouses who call to get an addicted loved one into treatment report terrifying changes in personality, attitude, and behavior. The callers feel that they no longer know their loved ones and these changes are the most significant motivating factors behind reaching out for help. If the treating therapist understands the neurobiology of addiction and how addiction changes the brain and its function, the concern and loss that family members experience is vali-

dated, allowing them to develop strategies for dealing with the impact of the disease (Erikson & Wilcox, 2001). Five sections of the brain are impacted by addiction: prefrontal cortex, limbic system, temporal lobes, anterior cingulate, and basal ganglia (Amen, 1994, 2004). In this brief paper, we will describe the impact on only the prefrontal cortex to illustrate the disastrous effect of addiction on brain function.

Single Photon Emission Computerized Tomography (SPECT) provides a technology for studying brain function. SPECT imaging was developed in the late 1970s. It uses nuclear technology to study cerebral blood flow, an indicator of brain activity. SPECT images or brain maps are 3-D constructions by supercomputers that identify certain brain activity, often deep in the brain, that correspond to cognitive, behavioral, and emotional functioning. SPECT images document that addiction is not a problem of brain *structure*, but rather a problem of brain *function* or *lack of function*.

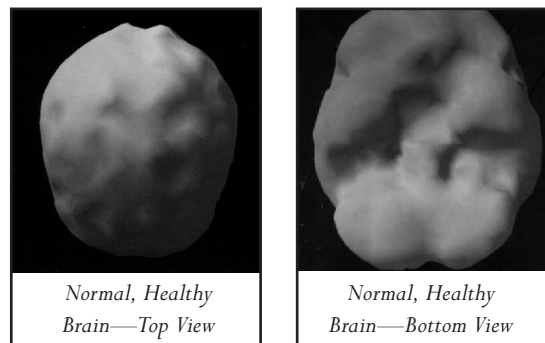
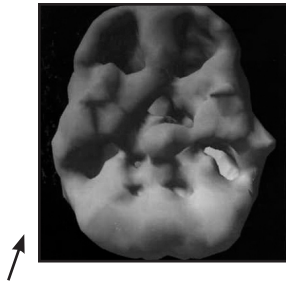


Figure 1. SPECT Images of Normal, Healthy Brain

The above images show a healthy, normal brain from both the top and bottom.

Note the smooth contours and surface fullness. There are no gaps or “holes” in the brain image, showing that all areas of the brain are functioning properly.



Prefrontal Cortex “holes” in functioning

Figure 2. SPECT Image of 18-year-old with 3-year history of marijuana use—4 times/week

The above image graphically shows the functional “holes” in the pre-frontal cortex of an 18-year-old who has been using cannabis four times a week since age 15. The First Call described above was from a parent about his 18-year-old son. This image shows how his son’s brain is not functioning in a healthy way and has left the father “living with a stranger.”

The prefrontal cortex is the first part of the brain affected by alcohol and other drugs. This is where the executive functions of judgment, impulse control (inhibitions), and self-monitoring are located, so it is not surprising that excessive use of alcohol and other drugs first impact judgment, inhibition, and rational thinking. It also augments the memory function of the temporal lobes, playing a major role in how memory is utilized as a learning tool that then appropriately guides and governs behavior (Nestler, 2001).

The prefrontal cortex is also involved in a number of coping functions: attention span, organization, learning from experience, empathy, and problem solving. Malfunction of the prefrontal cortex due to addiction results in irrational thinking, inability objectively to assess oneself, self centeredness, poor judgment, inability to learn from experience, disorganization, decreased attention span, becoming easily bored, short temper and argumentativeness, and becoming thin skinned (Hyman, 1994).

The effects of alcohol/drugs on the brain can

vary depending on the age of the person and the type of drug used. For instance, in the case example with the telephone dialogue at the start of the paper, the parent was calling in about her 18-year-old son. We know that the prefrontal cortex normally continues to develop through the teen years and into the early twenties. The immature and/or problematic behavior patterns typically associated with adolescence are directly related to prefrontal cortex maturation and function. When an under-developed prefrontal cortex is impacted by drugs and/or alcohol, the neurobiological effects are more quickly noticed and the longer the individual continues to abuse alcohol/drugs, the more developmental catching up that individual will have in later life. These are the adults who are described as perennial adolescents with poor impulse control and judgment, immature handling of situations and relationships, difficulty with authority figures, irresponsibility, and irrational decision making. The old recovery adage that states, “A person stops growing emotionally at the point where the addiction began,” is validated by the newest SPECT images (NIH, 2006).

The best prevention technique parents can use to reduce the likelihood of addiction is to postpone their son or daughter’s age of starting to use alcohol/drugs as long as possible – certainly until the age of 20. The older an individual is when she or he starts to abuse alcohol or drugs, the less likely this individual will ever experience an addiction problem, regardless of genetic predisposition. “People who reported starting to drink before the age of 15 were four times more likely to also report meeting the criteria for alcohol dependence at some point in their lives” (DeWit, Adlaf, Offord, & Ogborne, 2000, pp. 745-750). These youngsters displayed problem-drinking patterns, using alcohol to “get high” rather than participating in what might be called culturally sanctioned social drinking with their parents (Grant & Dawson, 1997).

The research shows that all psychoactive drugs

impact the prefrontal cortex. Some drugs impact more quickly than others. For instance, cocaine has a much quicker and stronger impact on the prefrontal cortex than alcohol. It should also be noted that long-term neurobiological damage also differs by type of drug (Erikson, 2007). For instance, methamphetamine, cocaine, and ecstasy have all been shown to have long-term (over two years) impact on the neural pathways of the brain, suggesting it would be more difficult successfully to treat addiction to these particular substances (Zickler, 2000). The rate of healing the prefrontal cortex is dependent on such factors as the drug(s) of choice, the amount, and frequency of use, the length of use, and the age of the individual. Recent research indicates that it is necessary to have a minimum of 90 days of abstinence to show sufficient healing of the prefrontal cortex to return cognition, attitude, and self-assessment to a rational level of functioning (Lemonick, 2007).

When family members understand that the effect of addiction on the brain provides a rationale for their experience, their concerns and sense of living with a stranger are validated. They are then able to mobilize their energies and increase their commitment to focus on the problems and take action. The family is motivated to start the process of motivating their addicted individual to enter treatment. A profound change has occurred and the family dares to hope that they can get their loved one back, rather than being overwhelmed by despair.

Identity and Ambiguous Loss in the Family

The injury to the brain from addiction is, in many ways, similar to other types of brain injuries that have a profound impact on family relationships. Extensive research on the relational impact of Alzheimer's disease has been documented (Boss, 1999, 2006). Landau and Hissett (in press) describe the recent exploration of a similar process in the case of MTBI. Unless this process is

recognized and dealt with in the relational setting, relational breakdown including problems with children and adolescents, marital problems, and divorce are likely to result.

In a very similar way, the loss of a loved one to the addictive process causes serious confusion because the person is still physically present, but is behaving very differently from the person the family knew and loved. The loved one's physical and emotional deficits profoundly alter interactions with family and others (Koob et al., 2004). This change in identity of the addicted individual (with or without his or her awareness) creates a sense of boundary ambiguity in couples and families. This may manifest as loss of the addicted person as the family knew her or him, as well as loss of the family system as it once was. All the rules have suddenly changed, and family members struggle to develop new boundaries and maintain effective communication. With such ambiguous loss, the boundary ambiguity is left unresolved. Since the addicted person is still present, family members do not recognize or grieve the loss of the loved one, and are often unable to heal and move on. Similarly to Seaburn's (1990) description of cancer as the unwelcome guest and Landau and Hissett's (in press) description of MTBI becoming the dominant topic in a family where a member has suffered a head injury, families dealing with addiction frequently struggle with the realization that the disease "has left a stranger in their midst who has become the predominant presence in every conversation and major decision" (Landau & Garrett, in press, 2008).

Families dealing with addiction refrain from discussing their experiences to avoid alienation, blame, guilt, and shame. They "walk on egg shells," terrified of losing the addicted individual by dealing openly with the problem. This combination of ambiguity and secrecy compounds the problem. Clinically, these effects appear to be associated with considerable stress, and may cor-

relate with the breakdown of couple, parent, and family relationships (Landau & Hissett, in press). The person (usually the spouse or parent) living with an addicted person is likely to make frequent visits to the primary care provider's office with minor ailments, or to consult a therapist about depression and anxiety. Unless specifically asked about addiction in the family, the cause of the distress might never come to light as in the situation of Mrs. M. described below (Landau & Garrett, in press, 2008).

A 43-year-old woman, Mrs. M., who had requested therapy for depression and headaches, reluctantly brought her 18-year-old daughter, Mary, and 15-year-old son, Jerry, to the first session with her. Mrs. M. explained that her husband was too busy at work to take the time to accompany them. While she described a happy, successful family, the teenagers pulled faces and at times smirked behind her back. Finally, as she described her husband in glowing terms, Jerry burst out, "If you're so happy, why are you always in bed with a migraine?" At this point, Mary said, "If you're not going to tell the story I will." In total surprise, her mother asked, "What story?" "You have a headache every weekend when Dad comes home. The only time you do things with us, like going to movies or the pool, are the weekends he's away on business."

Mrs. M. looked stunned and explained that the changes in her husband's behavior were related to his overload in the office and his extensive travel as a result of promotion at work. She described how he frequently seemed to be distracted and that his concentration was not what it used to be. Jerry complained that he could no longer ask his father a simple question, "without getting my head bitten off." Mrs. M. also said that he'd become somewhat moody and had been involved in a recent accident. Mother had not noticed any relationship between her migraines and his behavior and felt that her depression was just a result of her age and hormonal situation.

On careful questioning about the gradual changes in Mr. M's behavior and habits, the family started to realize that he had begun to drink most Friday nights when he was home. In fact, sometimes, he even smelled of drink when he arrived. They had not associated this fact with any of the recent changes in him or in their family relationships. On further exploration, while Mrs. M. still rationalized his behavior in terms of his work situation, her daughter Mary sighed and said, "Gosh Mom, I hadn't realized, until we put it together now, how much he's been drinking. How could you not have noticed? He's not the dad I grew up with and he's not there for any of us any more. He hasn't seen a single one of Jerry's football matches this year and he pushed him to play in the first place."

While the children had been disturbed by the changes in their father, mother had attributed all them to his work situation. On careful assessment it became apparent that father had been drinking increasingly heavily over the past year, and was showing distinct signs of neurobiological damage. The family made a commitment to work with the therapist to motivate dad to accompany them to the next meeting and felt confident that he would do so in order to help his wife get better.

Addicted relationships are always fraught with guilt, shame, and blame, reinforced by a lack of societal understanding about the impact of addiction on the functioning of the family. Unspoken anger and helplessness of family members and concerned others increases as the addictive process causes deterioration of the brain, resulting in cognitive deficit, reduction in rational thought, decreased responsibility, and increased impetuosity. These factors further reduce the addicted individual's insight and motivation to stop using. Denial prevails.

Fewer than 10% of individuals addicted to substances ever get into treatment. The family is a neglected but critical source of motivation for

treatment entry and maintaining the individual in treatment. In fact, the only path to long-term recovery is through family recovery, not just individual recovery. Alcoholism affects the family, and the family can positively affect recovery from alcoholism. Helping members of the family and extended support system to understand the role of neurobiology in addiction reduces their ambivalence about the changes in their loved ones and allows them to focus on this disease with knowledge and hope.

Practical Implications for Clinicians Answering a Family Member's Request to Help a Resistant Loved One Getting Into Treatment

Overview of Invitational Intervention: The ARISE Model.

Addiction kidnaps not only the addicted individual but holds the family for ransom with its overwhelming power. The ARISE Model (A Relational Intervention Sequence for Engagement) mobilizes family and concerned others to motivate the addicted individual into treatment while moving the family as a whole into recovery. ARISE is a three-level, pre-treatment, engagement process based on openness and a commitment to honor and maintain the investment and connectedness of families. The ARISE Model has no surprises or secrets. The ARISE Interventionist is present (either in person or on the telephone) for all meetings. The family and support system take a very active role in the intervention process. This minimizes the clinician's expenditure of time and cost and empowers the family, overcoming their blame, shame, and guilt. The Invitational Intervention method stops at the first level where the addicted individual enters treatment. The principle of ARISE is to stop at the first level that works, thereby minimizing the time and effort of the outside professional – the ARISE Interventionist – as well as drawing on the resilience of the family and giving them back

the power that the addiction has usurped.

Level 1 uses motivational techniques designed specifically for telephone coaching, but can also be applied in face-to-face sessions. The ARISE Interventionist helps the “First Caller” or “Concerned Other” establish a basis of hope, identify whom to invite to the initial intervention meeting, design a strategy to mobilize the support group, teach techniques to successfully invite the alcohol-dependent or addicted individual to the first meeting, suggest a recovery message (based on the intergenerational story of loss and on the neurobiological damage to the brain), and get a commitment from all invited individuals to attend the initial meeting regardless of whether or not the alcoholic attends. Level 1 comprises the First Call and The First Meeting. The ARISE Interventionist conducts both, while encouraging the First Caller and Intervention Network to take a central role in the decision-making and motivating the addicted individual to enter treatment.

In a recent study, over 55% of the 110 substance abusers in the sample entered treatment during Level 1 (Landau et al., 2004). Concerns about the loss of the loved one as the family once knew him or her always comes up during the First Call. The protocol includes questions about changes in cognition, responsibility, attitude, behavioral functioning, and relationships and builds on the interest of the First Caller in getting the loved one back (Landau & Garrett, in press, 2008). The ARISE Interventionist validates the changes described by the First Caller with solid scientific information relating the neurobiological process of addiction to the specific changes reported. The First Caller generally experiences a sense of immediate relief and begins to hope that recovery might be possible. Once this has occurred, the First Caller is in a far stronger position to mobilize the rest of the family and support network to motivate the addicted individual into treatment (Garrett, et al., 1999).

Level 2 follows if treatment does not start dur-

ing Level 1. Typically in Level 2, two to five face-to-face sessions are held, with or without the alcohol-dependent or addicted individual present, to mobilize the Intervention Network in developing motivational strategies to attain the goal of treatment engagement. Very few families (less than 2%) need to proceed to level 3 (Landau et al., 2000).

In **Level 3**, family and friends set limits and consequences for the alcohol-dependent or addicted individual in a loving and supportive way. By the time the Intervention Network gets to this point, the alcohol-dependent or addicted individual has been given and has refused many opportunities to enter treatment. Because the alcohol-dependent or addicted individual has been invited to each of the Intervention Network meetings in Levels 1 and 2, this final limit-setting approach is a natural consequence and does not come as a surprise. The Intervention Network commits to supporting each other in the implementation of the agreed upon consequences (Garrett, 1997).

Outcome data on ARISE (NIDA study DA09402) demonstrates that 83% of addicted individuals enter treatment as the result of families using the Invitational Intervention approach (Landau et al., 2004). There was no significant difference in severity of the addiction, drug of choice, or level of experience of the ARISE Interventionist. The average time taken per intervention was less than 90 minutes (average 88 minutes; median 75 minutes).

Summary

There is clear evidence that alcohol and drugs cause severe damage to the brain. The earlier the age of onset the greater is the damage to the brain and the likelihood of the development of addiction. These neurobiological changes have a profound impact on the behavior and personality of the addicted individual to the extent that those closest to him or her feel that they are living with a stranger. Unless this process of deterioration is recognized and the resulting ambiguous loss is dealt with in the relational setting, relational breakdown

is likely to result. Early recognition and treatment are essential for promoting brain recovery and for maintaining important relationships.

One of the most effective methods of ensuring that this occurs is to develop outreach programs offering the Invitational Intervention as a way of educating and mobilizing families and concerned others to motivate their addicted loved ones into treatment. Invitational Intervention: The ARISE Model is used in illustration of this process. ARISE works particularly well because it enables families to get a high percentage of their addicted individuals into treatment. It maintains positive connections with family and support systems well into the recovery period, focusing not only on individual recovery but also on family recovery (Fernandez et al., 2006).

The authors also encourage readers to utilize some of the following references for psychoeducational purposes when working with family members and/or addicted individuals:

- 1) www.pubs.niaaa.nih.gov/publications/arh21-2/101.pdf
- 2) www.nature.com/neuro/focus/addiction/index
- 3) www.druginfo.nsw.gov.au/information_&resources/addiction_and_neurobiology
- 4) [Addiction is a Brain Disease, and It Matters. www.drugabuse.gov/scienceofaddiction](http://www.drugabuse.gov/scienceofaddiction)
- 5) Levine, R. R., Walsh, C. A., and Schwartz, R. D. (1996). *Pharmacology: Drug actions and reactions*. New York: Parthenon Publishing Group.

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Fewer than 10% of addicted individuals ever receive treatment for their addiction. Families can serve as a significant resource for reaching many more addicted individuals and motivating them to enter treatment. One of the most significant experiences inducing family members to reach out to a clinician for help with their addicted member is the realization that the addicted individual they are living with has become a stranger. This can be readily explained to families if the clinician is familiar with the impact of addiction on brain functioning. This paper focuses on the changes in one section of the brain, the prefrontal cortex, as an example of the effect of addiction on the neurobiological functioning of the brain, to validate the family members' experience of living with a stranger. The paper then presents a best practice model for working with families who wish to get an addicted loved one into treatment. The 3-Level empirically based, manual-driven method of Invitational Intervention, A Relational Intervention Sequence for Engagement (ARISE) is presented as an effective tool for helping families to get their loved ones into treatment.