IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF KANSAS

UNITED STATES of AMERICA, ***Plaintiff,*** **v.** **ALEXANDER E. BLAIR,** ***Defendant.***	**Case No. 15-40031-DDC**

SENTENCING MEMORANDUM

On August 24, 2016, the Court will sentence Alex Blair for a violation of 18 U.S.C. § 371 and §2, specifically a conspiracy to commit an offense against the United States in violation of 18 U.S.C. 844(f)(1). The defense respectfully requests that the Court consider the limited factual basis for Mr. Blair's guilty plea and his highly unique personal circumstances and vary from the guidelines' imprisonment sentence to impose a sentence of five years of probation.

The defense offers the following argument and authorities in support of this sentencing request.

ARGUMENT AND AUTHORITIES

The Sentencing Reform Act, as modified by *Booker*, requires the Court "to take account of the sentencing guidelines together with other sentencing goals" when sentencing a defendant. *United States v. Booker*, 543 U.S. 220, 259 (2005). Although the

"Guidelines should be the starting point and the initial benchmark," district courts may impose sentences within statutory limits based on appropriate consideration of all of the factors listed in § 3553(a), subject to appellate review for "reasonableness." *Gall v. United States*, 552 U.S. 38, 49 (2007). A district court "may not presume that the Guidelines range is reasonable," but must "make an individualized assessment based on the facts presented." *Id.* at 50.

The § 3553(a) factors support a non-prison sentence in this case.

I. Alex's offense must be considered in light of his extremely unique history and characteristics.

On May 23, 2016, Alexander Blair pleaded guilty to the Information (Doc. 18) charging him with a violation of 18 U.S.C. § 371 and § 2, specifically a conspiracy to commit an offense against the United States in violation of 18 U.S.C. 844(f)(1). Underlying Alex's conviction was a $100 loan he made to John T. Booker, Jr. for the purpose of renting a storage unit. Alex made the loan knowing that Booker wanted to commit an act of jihad with the help of his "handler," knowing that the loan would help Booker follow through with instructions from his "handler," and believing that the storage unit was part of plans for a suicide bombing. Alex also knew that Booker intended to direct his jihad at the United States military.

That is the simplest way of stating Alex's crime, and it suffices to establish guilt. But formulating an appropriate sentence for Alex requires more than consideration of guilt at

this most basic level. Alex's culpability, and the sentence that fits it, can only be properly evaluated in the context of Alex's extremely unique history and characteristics.

Alex was born with Williams syndrome, a genetic condition caused by micro-deletion of 16 genes on chromosome 7q11.23. Along with several physical health problems, Williams syndrome causes developmental delays and produces a characteristic personality profile. Overall, the effects of Alex's unique biological constitution made him particularly vulnerable and naive in his interactions with Booker. The Diagnostic Interview Report prepared by forensic psychiatrist Stephen E. Peterson, M.D. after evaluating Alex based on testing, a personal interview, family interviews, and a review of Alex's educational and medical records, and reviewing relevant discovery (Exhibit 1), and scientific articles on Williams syndrome help explain why Alex's guilt does not warrant the penalty suggested by the Sentencing Guidelines.

While Alex "demonstrates near normal intelligence, . . . he experienced abnormal-brain-development mediated communication and interpersonal difficulties." Exhibit 1, Dr. Peterson's Report, p. 18. As a result of his Williams syndrome, Alex demonstrates reasoning patterns that are not in keeping with his biological age. Exhibit 1, Dr. Peterson's Report, pp. 12, 15. His thinking is simplistic and concrete, not lending itself to the abstract reasoning that would be expected of a typical adult in his late twenties. Exhibit 1, Dr. Peterson's Report, pp. 12, 15. He also exhibits the characteristic Williams

syndrome personality, which includes a high sociability and compulsion to connect with others, combined with an unfortunate competing inability to process nuanced social cues. Exhibit 1, Dr. Peterson's Report, p. 15; *see also* David Dobbs, *The Gregarious Brain*, N.Y. Times Mag., July 8, 2007, http://www.nytimes.com/2007/07/08/magazine/08sociability-t.html?_r=0, attached as Exhibit 2. Thus, while those affected by Williams syndrome are characteristically extremely friendly, they often have trouble sustaining friendships, especially with peers. Exhibit 3, Jarniven, et al., The Social Phenotype of Williams Syndrome, Curr. Opin. Neurobiol. 23(3):417; Exhibit 4, Godbee & Porter, Comprehension of sarcasm, metaphor and simile in Williams syndrome, Int. Lang. Comm. Disord., 48(6):652 (Nov-Dec 2013). "As a consequence of this chromosomal deletion disorder, [Alex] does not have the normal appreciation for subtle interpersonal interactions, awareness of danger, or normal feelings of interpersonal warning. It places him at considerable risk due to his 'cocktail personality' (high level of approachability and need for affiliation with others) for easy manipulation because of his social naïveté and desire for social affiliation." Exhibit 1, Dr. Peterson's Report, p. 15.

Those with the opportunity to observe Alex over time, even if unfamiliar with Williams syndrome, have observed its characteristic social phenotype.

His aunt and uncle noted that "[f]rom the time Alex was young it also was obvious that he is a bit different. Despite his warmth and social nature, he has demonstrated a social

and physical awkwardness, including a slight speech defect. We heard stories of challenges he faced in school and with keeping up with his peers. We watched him struggle with how to transition to adulthood with confidence." Exhibit 5, Letters of Support, letter from Eric & Donna Davies. When the Davies came across a story on Williams syndrome in *The Columbus Dispatch*, they felt like it was explaining the very traits and behavior they had observed watching Alex. *Id.*

Rena Kilgore, Alex's elementary school teacher, remembers: "He was friendly to everybody, making no distinction between whether another student was popular or not, nice in return or not, or interested in talking to him or not." Exhibit 5, Letters of Support, letter from Rena Kilgore. She recalled that Alex as a "teacher pleaser" in his childhood and has observed him to have maintained the same attitude into his adulthood, noting that he would do anything to please an employer. *Id.*

Alex's former elementary school principal, Pat Happer, recalls observing the social struggles Alex faced throughout his childhood. Although Alex "seemed to easily relate to adults[,] especially those that reacted to him in a friendly manner," he was "typically awkward at times when communicating with his peers." Exhibit 5, Letters of Support, letter from Pat Happer. Regarding the way that Alex's peers received him, Mr. Happer also noted, "He was always expected to make appropriate decisions and was held accountable on those occasions when he didn't." *Id.*

While his family, family friends, and educators held him in high esteem, Alex still lacked for peer bonding. Alex's social life has been in keeping with what is often expected for individuals with Williams syndrome. Although there are many in his life who care for him, *see* Exhibit 5, Letters of Support, Alex cannot really boast any personal friends. He is used to people avoiding him. Exhibit 1, Dr. Peterson's Report, p. 11; *see also id.* at p. 18 ("Throughout his life, he has felt socially isolated, in need of social contact (highly empathic), and seeks high levels of interpersonal affiliation despite multiple episodes of being rebuffed. Until fairly recently, he was less aware of his social awkwardness, but aware of being shunned by others, and fully aware of never really fitting in.").

Although Alex was experienced at being lonely, he never became comfortable with it; as a result of his Williams syndrome, the yearning for social connection endured. Searching for a place to be part of something, Alex has been drawn to houses of religion. Exhibit 1, Dr. Peterson's Report, pp. 12, 14. Part of what interested Alex in Islam is that he did not feel like he was fully a part of the Christian congregations he had joined previously. Exhibit 1, Dr. Peterson's Report, p. 13.

In January 2015, just three months before he was arrested and charged in this case, Alex began attending the Islamic Center of Topeka. Alex was not seeking an accomplice or co-conspirator, for he had no criminal plans or motivations. Alex was simply looking to feel connected on an interpersonal level. It was then that Booker approached and

befriended Alex. Booker's willingness to associate with Alex was a rare and welcome opportunity for Alex, who was especially lonely and particularly receptive to Booker's interest in talking and being friends.

Alex did not care for every aspect of Booker. Even excluding Booker's criminal interests, there was plenty to not like about him. Booker was bossy and self-absorbed, he constantly spoke of himself and his own interests, and he lectured Alex about what he believed was proper in Islam. Alex's father observed that Booker did all the talking in his relationship with Alex and tried to control Alex in social situations; he hoped Alex would tire of it and move on from Booker in time. Exhibit 5, Letters of Support, letter from Tom Blair. But Alex was enchanted to have found someone who wanted to socialize with him—even someone who barely let him get a word in and who constantly used him for rides (Booker did not drive, but Alex had access to his parents' car).

And Alex was compelled to try to maintain that relationship by biologically-mediated psychiatric impulses completely out of his control. Although he did not want to personally participate in Booker's jihad, it made Alex feel included and important when Booker made him privy to the "confidential" information. These were feelings that Alex, as a result of his Williams syndrome, had yearned for all his life but had been unable to attain until that time. The significant influence of Alex's unique mental profile in his interactions with Booker cannot be understated.

As described by forensic psychiatrist Stephen E. Peterson, M.D., "[Alex] has great difficulty keeping friends, so has a bit of a 'puppy syndrome.' That is, he easily latches onto those who show him positive feedback, without much of a warning system whether such trust is warranted. He was likely to not understand his own social vulnerability to be manipulated by others." Exhibit 1, Dr. Peterson's report, p. 16. In addition, his biological composition prevents him from registering fear and threat in a normal way. Exhibit 1, Dr. Peterson's Report, p. 21.

In sum, Alex was both "biologically predisposed not to perceive the seriousness of Mr. Booker's threat" and "more likely to be manipulated by Mr. Booker than the average person." Exhibit 1, Dr. Peterson's Report, p. 22. And, in addition to acting under considerable biologically-mediated social naivete, Alex's reasoning processes were impaired as compared to his peers. *See* Exhibit 1, Dr. Peterson's Report, pp. 12, 15. Dr. Peterson ultimately concluded that Alex "participated in the actions with Mr. Booker without normal adult mental capacity." Exhibit 1, Dr. Peterson's Report, p. 22.

Thus, while Alex may be guilty of violating the law, his blameworthiness is substantially mitigated by his unique psychiatric circumstances. As inchoate offenses like conspiracy rely heavily on the offender's mindset, the impact of Alex's Williams syndrome on his participation in the offense is particularly significant. The punishment calculated under the Sentencing Guidelines likely attributes substantially more malice to the typical

offender than was actually present in this case. As Alex is far from typical, the Guidelines sentence must be viewed with particular caution in this case.

II. The need for the sentence imposed (A) to reflect the seriousness of the offense, to promote respect for the law, and to provide just punishment for the offense; (B) to afford adequate deterrence to criminal conduct; (C) to protect the public from further crimes of the defendant; and (D) to provide the defendant with needed educational or vocational training, medical care, or other correctional treatment in the most effective manner.

A. A non-prison sentence adequately reflects the seriousness of Alex's offense and provides adequate deterrence to any future criminal conduct.

As developed in more detail above and below, Alex was not predisposed to this crime and presents a very low risk for reoffense. Monitoring Alex through a non-prison sentence will provide just punishment while simultaneously deterring future criminal conduct. Dr. Peterson noted that Alex's "compliant personality features" would make him particularly well suited to cooperating with Probation's supervision requirements and that Alex's "very motivated, well-informed, family" could assist with supervision. Exhibit 1, Dr. Peterson's Report, p. 22. Defense counsel submits that this has been the case during Alex's successful time on pre-trial supervision.

B. As Alex's criminality was a product of singular circumstance rather than criminal predilection, the public does not need protection from him.

Alex did not become involved in his offense due to criminal inclination, but under peculiar circumstances that are highly unlikely to be repeated. "His problem solving

ideation was somewhat rigid, due to his developmental difficulties, suggesting he would not be an independent mover in any kind of 'terrorist plot.'" Exhibit 1, Dr. Peterson's Report, p. 16. And, although Alex was naive at the time of his relationship with Booker, he is not incapable of learning. Coming before a federal court on criminal charges has had an extraordinary impact on him. *See, e.g.*, Exhibit 6, Alex Blair's letter to the Court; Exhibit 1, Dr. Peterson's Report, frequently noting how this case has overwhelmed Alex.

Dr. Peterson assessed other risk factors to be particularly low with Alex. "No alcohol dependency, drug dependency, schizophrenic spectrum disorder, cyclical mood disorder, antisocial personality, antisocial adult behavior, or violence-oriented mindset is evident in Alex Blair's functioning." Exhibit 1, Dr. Peterson's Report, p. 22. And "Mr. Blair did not demonstrate any overriding violent tendencies, grudge holding, prior legal difficulties, exploitative mindset, antigovernment stance, militaristic focus, or committed extremist state of mind that might make him an ongoing danger." Exhibit 1, Dr. Peterson's Report, p. 22.

C. The most effective form of correctional treatment would be provided through a non-prison sentence.

Considering Alex's unique circumstances, it is possible that incarceration would have a transformative effect on him in precisely the opposite way that the Court would desire. Dr. Peterson's report explains:

> Incarceration would be very detrimental due to Alex Blair's biologically-mediated lack of threat awareness. Even though he is loquacious and can interact with verbal abilities that are at the near normal IQ level, his chromosome-deletion mediated language processing impairments are permanent. In prison, his Williams syndrome mediated behavior will readily prevent his perception of threats from others. He is biologically 'hardwired' to misinterpret threats as positive interactions. He may uncritically affiliate with those he perceives as friendly to him. He may even yearn for contact enough to align with anyone. That puts him at extreme risk for sexual, physical, and interpersonal exploitation in prison. **Such exploitation would further damage his gullibility, and may prevent him from letting go of a penitentiary mindset when released. Even more ominously, out of an instinct for physical survival, he may mold his behaviors toward violence and then be unable to let that go once released from custody.** From a psychiatric perspective, putting him in a penitentiary could very much result in his experiencing physical, sexual, and emotional traumas. These would leave him further damaged (through persistent post traumatic reliving or flashbacks, potentially physical injuries, and permanently altered trauma pathways in the brain) and still inherently without a biological ability to deal with complex traumatic life events.

Exhibit 1, Dr. Peterson's Report, p. 23 (emphasis added). While Alex committed a crime, he has never been a primary danger to society. Given his unique situation, it is possible that a prison sentence could change that.

III. The kinds of sentences available.

There is no minimum sentence for Alex's crime. The maximum sentence that may be imposed is five years' imprisonment.

IV. The sentencing range established by the Guidelines.

Alex's presentence investigation report reflects his total offense level as 33 and her criminal history category as I, yielding a guideline range of 235 to 293 months'

imprisonment. Because the statutorily authorized maximum sentence of five years is less than the minimum of the applicable guideline range, the guideline term of imprisonment is 60 months' imprisonment.

V. Any pertinent policy statement issued by the Sentencing Commission.

The defense is unaware of any pertinent policy statement issued by the Sentencing Commission.

VI. The need to avoid unwarranted sentence disparities among defendants with similar records who have been found guilty of similar conduct.

The defense is unaware of any similar defendants who have been found guilty of similar conduct. Rather, Alex is possibly the most unique defendant and his case is one of the most peculiar matters defense counsel has ever encountered.

While it may seem appropriate to compare Alex to his co-conspirator, Booker, aligning the two defendants should be resisted in light of their substantial personal differences and the significant distinctions between the paths toward their convictions. As Dr. Peterson noted, the men were operating at completely different levels of initiative and culpability:

> From a psychiatric perspective, Mr. Blair's participation with Mr. Booker would always have been at a subordinate level. Mr. Blair's Williams syndrome predisposed him to feel empathically aligned with Mr. Booker to try to help him, as he felt aligned with most others even those who shunned him. Mr. Blair's life pattern demonstrated such a pattern. In addition, research relating to impaired language development, impaired oromotor praxis (developmental mimicking of normal facial expression

> understanding), and impaired brain activation clearly demonstrate that Mr. Blair was biologically (mental defect) predisposed to be unable to perceive the danger of, process alternative interventions for, and to contravene Mr. Booker's actions.

Exhibit 1, Dr. Peterson's Report, p. 22.

CONCLUSION

In many cases, the applicable Guidelines range can provide an appropriate sentence, or very close to it, because the Sentencing Guidelines are "the product of careful study based on extensive empirical evidence derived from the review of thousands of individual sentencing decisions." *Gall v. United States*, 552 U.S. 38, 40 (2007). But, every so often, there is a case that turns that premise on its head—a case like this one. Because the facts of this case and Alex's history and nature are so unique, an empirical approach that draws from a pool of vastly different defendants and circumstances is entirely unhelpful.

Instead of looking to the guidelines, the Court must select a sentence within the statutory range— allowing anything from probation to five years in prison. The ultimate issue for the Court is whether protecting society means imprisoning Alex. And, if so, for how long? What is the right thing to do with Alex, for him and for society?

"[F]our considerations--retribution, deterrence, incapacitation, and rehabilitation--are the four purposes of sentencing generally, and a court must fashion a sentence 'to achieve the[se] purposes . . . to the extent that they are applicable' in a given

case." *Tapia v. United States*, 564 U.S. 319, 325 (2011). None of the four sentencing considerations support a sentence of imprisonment in this case.

Retribution: Discussion of retribution as a sentencing objective is found almost exclusively with respect to violent crimes and commonly in death penalty litigation. Retribution does not mesh well with an inchoate offense. That is particularly true in this case, where Alex loaned $100 to Mr. Booker, who mistakenly believed he was acting at the behest of terrorists (when, in fact, his contacts were government agents, and no terrorist act would ever come to fruition).

Deterrence: It is nonsense to suggest that sending Alex to prison might deter terrorist acts by radical individuals willing to die for their cause. And deterring future misconduct by Alex certainly does not require a prison sentence. Rather, imprisoning Alex could have the opposite effect.

Incapacitation and rehabilitation: Alex is young. There is no need for nor value in short-term incapacitation. Instead, the true value in sentencing Alex is the opportunity to establish a lengthy period for monitoring him in the community—establishing a pattern and foundation for the balance of his life.

Thoughtful consideration of sentencing objectives and the particular defendant before the Court indicate that a non-custodial sentence will provide appropriate

punishment that suits the best interest of society. For the foregoing reasons, the defense urges the Court to impose a non-prison sentence.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on August 12, 2016, I electronically filed the foregoing with the clerk of the court by using the CM/ECF system which will send notice of electronic filing to all parties of record.

s/ Christopher M. Joseph
Christopher M. Joseph

The New York Times Magazine

Magazine

The Gregarious Brain

By DAVID DOBBS JULY 8, 2007

If a person suffers the small genetic accident that creates Williams syndrome, he'll live with not only some fairly conventional cognitive deficits, like trouble with space and numbers, but also a strange set of traits that researchers call the Williams social phenotype or, less formally, the "Williams personality": a love of company and conversation combined, often awkwardly, with a poor understanding of social dynamics and a lack of social inhibition. The combination creates some memorable encounters. Oliver Sacks, the neurologist and author, once watched as a particularly charming 8-year-old Williams girl, who was visiting Sacks at his hotel, took a garrulous detour into a wedding ceremony. "I'm afraid she disrupted the flow of this wedding," Sacks told me. "She also mistook the bride's mother for the bride. That was an awkward moment. But it very much pleased the mother."

Another Williams encounter: The mother of twin Williams boys in their late teens opened her door to find on her stoop a leather-clad biker, motorcycle parked at the curb, asking for her sons. The boys had made the biker's acquaintance via C.B. radio and invited him to come by, but they forgot to tell Mom. The biker visited for a spell. Fascinated with how the twins talked about their condition, the biker asked them to speak at his motorcycle club's next meeting. They did. They told the group of the genetic accident underlying Williams, the heart and vascular problems that eventually kill many who have it, their intense enjoyment of talk, music and story, their frustration in trying to make friends, the slights and cruelties they suffered growing up, their difficulty understanding the world. When they finished, most of the bikers were in tears.

These stories are typical of those who have Williams syndrome. (Some people with the disorder as well as many who work with them simply call it Williams.) Williams syndrome rises from a genetic accident during meiosis, when DNA's double helix is divided into two separate strands, each strand then becoming the genetic material in egg or sperm. Normally the two strands part cleanly, like a zipper's two halves. But in Williams, about 25 teeth in one of the zippers — 25 genes out of 30,000 in egg or sperm — are torn loose during this parting. When that strand joins another from the other parent to eventually form an embryo, the segment of the DNA missing those 25 genes can't do its work.

The resulting cognitive deficits lie mainly in the realm of abstract thought. Many with Williams have so vague a concept of space, for instance, that even as adults they will fail at six-piece jigsaw puzzles, easily get lost, draw like a preschooler and struggle to replicate a simple T or X shape built with a half-dozen building blocks. Few can balance a checkbook. These deficits generally erase about 35 points from whatever I.Q. the person would have inherited without the deletion. Since the average I.Q. is 100, this leaves most people with Williams with I.Q.'s in the 60s. Though some can hold simple jobs, they require assistance managing their lives.

The low I.Q., however, ignores two traits that define Williams more distinctly than do its deficits: an exuberant gregariousness and near-normal language skills. Williams people talk a lot, and they talk with pretty much anyone. They appear to truly lack social fear. Indeed, functional brain scans have shown that the brain's main fear processor, the amygdala, which in most of us shows heightened activity when we see angry or worried faces, shows no reaction when a person with Williams views such faces. It's as if they see all faces as friendly.

People with Williams tend to lack not just social fear but also social savvy. Lost on them are many meanings, machinations, ideas and intentions that most of us infer from facial expression, body language, context and stock phrasings. If you're talking with someone with Williams syndrome and look at your watch and say: "Oh, my, look at the time! Well it's been awfully nice talking with you . . . ," your conversational partner may well smile brightly, agree that "this is nice" and ask if you've ever gone to Disney World. Because of this — and because many of us feel uneasy with people with cognitive disorders, or for that matter with anyone

profoundly unlike us — people with Williams can have trouble deepening relationships. This saddens and frustrates them. They know no strangers but can claim few friends.

This paradox — the urge to connect, the inability to fully do so — sits at the center of the Williams puzzle, whether considered as a picture of human need (who hasn't been shut out of a circle he'd like to join?) or, as a growing number of researchers are finding, a clue to the fundamental drives and tensions that shape social behavior. After being ignored for almost three decades, Williams has recently become one of the most energetically researched neurodevelopmental disability after autism, and it is producing more compelling insights. Autism, for starters, is a highly diverse "spectrum disorder" with ill-defined borders, no identified mechanism and no clearly delineated genetic basis. Williams, in contrast, arises from a known genetic cause and produces a predictable set of traits and behaviors. It is "an experiment of nature," as the title of one paper puts it, perfect for studying not just how genes create intelligence and sociability but also how our powers of thought combine with our desire to bond to create complex social behavior — a huge arena of interaction that largely determines our fates.

Julie R. Korenberg, a neurogeneticist at Cedars-Sinai Medical Center and at the University of California, Los Angeles, who has helped define the Williams deletion and explore its effects, believes the value of Williams syndrome in examining such questions is almost impossible to overstate. "We've long figured that major behavioral traits rose in indirect fashion from a wide array of genes," Korenberg says. "But here we have this really tiny genetic deletion — of the 20-some-odd genes missing, probably just 3 to 6 create the cognitive and social effects — that reliably creates a distinctive behavioral profile. Williams isn't just a fascinating mix of traits. It is the most compelling model available for studying the genetic bases of human behavior."

Korenberg's work is part of a diverse research effort on Williams that is illuminating a central dilemma of human existence: to survive we must relate and work with others, but we must also compete against them, lest we get left behind. It's like the TV show "Survivor": we want to keep a place in the group — we must — and doing so requires not only charming others but also showing we can contribute to

their success. This requires a finely calibrated display of smarts, savvy, grit and hustle. Show too little, and you're voted off the island for being subpar. Show too much, and you're ousted as a conniving threat.

Where is the right balance? A partial answer lies in the mix of skills, charms and deficiencies that is Williams syndrome.

Williams syndrome was first identified in 1961 by Dr. J. C. P. Williams of New Zealand. Williams, a cardiologist at Greenlane Hospital in Auckland, noticed that a number of the hospital's young cardiac patients were small in stature, had elfin facial features and seemed friendly but in some ways were mentally slow. His published delineation of this syndrome put Dr. Williams on the map — off which he promptly and mysteriously fell. Twice offered a position at the prestigious Mayo Clinic in Rochester, Minn., he twice failed to show, disappearing the second time, in the late '60s, from London, his last known location, with the only trace an unclaimed suitcase later found in a luggage office.

The rarity of Williams syndrome — about 1 in 7,500 people have it, compared with about 1 in 150 for autism or 1 in 800 for Down syndrome — rendered it obscure. Unless they had the syndrome's distinctive cardiovascular problems (which stem from the absence of the gene that makes blood vessels, heart valves and other tissue elastic and which even today limit the average lifespan of a person with Williams to around 50), most people with Williams were simply considered "mentally retarded."

This ended in the late 1980s, when a few researchers in the emerging field of cognitive neuroscience began to explore Williams. Among the most earnest was Ursula Bellugi, the director of the Laboratory for Cognitive Neuroscience at the Salk Institute for Biological Studies in La Jolla, Calif. Bellugi, who specializes in the neurobiology of language, was drawn to the linguistic strength that many Williamses displayed in the face of serious cognitive problems. The first person with Williams she met, in fact, came by referral from the linguist Noam Chomsky.

"The mother of that Williams teenager later connected me with two more, both in their teens," Bellugi said. "I didn't have to talk to them long to realize something special was going on. Here they had these great cognitive deficits. Yet they spoke with the most ardent and delightful animation and color."

To understand this uneven cognitive profile, Bellugi gave an array of language and cognitive tests to three groups: Williams children and teenagers, Down syndrome kids with similar I.Q.'s and developmentally average peers. "We would do these warm-up interviews to get to know them, ask about their families," said Bellugi, who, less than five feet tall and with a ready smile and an animated manner, is somewhat elfin and engagingly gregarious herself. "Only, the Williams kids would turn the tables. They'd tell you how pretty you look or ask, 'Do you like opera?' They would ornament their answers in a way other kids didn't. For instance, you'd ask an adolescent, 'What if you were a bird?' The Down kids said things like: 'I'm not a bird. I don't fly.' The Williams teens would say: 'Good question! I'd fly through the air being free. If I saw a boy I'd land on his head and chirp.' "

Bellugi found that this fanciful verbosity was accompanied by infectious affability. To measure it she developed a questionnaire and gave it to parents of Williams, Down and normal children. It asked about things like friendliness toward strangers, connections to familiar people, different social scenarios. At every age level, those with Williams scored significantly higher in sociability than those in the other groups. Having long studied the human capacity for language and its biological basis, Bellugi assumed that some extraordinary urge to use language drove this hypersociability: "The language just seemed to be erupting out of them."

Then she attended a meeting of Williams families that included infants and toddlers. "That was about a year into my research project," she says. "The room was full of little ones — babies, toddlers who weren't speaking yet. And when I came in the room all the young children old enough to walk ran to the door to greet me. No clinging to Mom; they just broke away. And when I would talk to mothers holding infants — literally babes in arms — some of these babies would almost dive out of their mothers' arms to meet me.

"I knew then I was wrong. The language wasn't driving the sociability. If anything, it was the other way around."

Developmental psychologists sometimes call the social urge the "drive to affiliate." It seemed clear early on that the Williams deletion, which was definitively identified in the mid-1990s, either strengthened this drive or left it unfettered. But how do

missing genes steer behavior toward gregariousness and engagement? How can a deletion heighten a trait rather than diminish it?

I got a hint when I met Nicki Hornbaker, who is 19, at Bellugi's office in La Jolla. Nicki, whose Williams was diagnosed when she was 2, has been participating as a subject in Bellugi's research for 15 years. She and her mother, Verna, drove down from Fresno that day to continue testing and to talk with me about living with Williams syndrome. Like most people with Williams, Nicki loves to talk but has trouble getting past a cocktail-party-level chatter. Nicki, however, has fashioned at least a partial solution.

"Ever since she was tiny," Verna Hornbaker told me, "Nicki has always especially loved to talk to men. And in the last few years, by chance, she figured out how to do it. She reads the sports section in the paper, and she watches baseball and football on TV, and she has learned enough about this stuff that she can talk to any man about what the 49ers or the Giants are up to. My husband gets annoyed when I say this, but I don't mean it badly: men typically have that superficial kind of conversation, you know — weather and sports. And Nicki can do it. She knows what team won last night and where the standings are. It's only so deep. But she can do it. And she can talk a good long while with most men about it."

In the view of two of Bellugi's frequent collaborators, Albert Galaburda, a Harvard Medical School professor of neurology and neuroscience, and Allan Reiss, a neuroscientist at the Stanford School of Medicine, Nicki's learned facility at sports talk illustrates a central lesson of Williams and, for that matter, modern genetics: genes (or their absence) do not hard-wire people for certain behaviors. There is no gene for understanding calculus. But genes do shape behavior and personality, and they do so by creating brain structures and functions that favor certain abilities and appetites more than others.

Reiss and Galaburda's imaging and autopsy work on Williamses' brains, for instance, has shown distinct imbalances in structure and synaptic connectivity. This work has led Galaburda to suspect that some of the genes missing in the Williams deletion are "patterning genes," which direct embryonic development and which in this case dictate brain formation. Work in lab animals has shown that at least one

patterning gene choreographs the developmental balance between the brain's dorsal areas (along the back and the top of the brain) and ventral areas (at the front and bottom). The dorsal areas play a strong role in vision and space and help us recognize other peoples' intentions; ventral areas figure heavily in language, processing sounds, facial recognition, emotion, music enjoyment and social drive. In an embryo's first weeks, Galaburda says, patterning genes normally moderate "a sort of turf war going on between these two areas," with each trying to expand. The results help determine our relative strengths in these areas. We see them in our S.A.T. scores, for example: few of us score the same in math (which draws mostly on dorsal areas) as in language (ventral), and the discrepancy varies widely. The turf war is rarely a draw.

In Williams the imbalance is profound. The brains of people with Williams are on average 15 percent smaller than normal, and almost all this size reduction comes from underdeveloped dorsal regions. Ventral regions, meanwhile, are close to normal and in some areas — auditory processing, for example — are unusually rich in synaptic connections. The genetic deletion predisposes a person not just to weakness in some functions but also to relative (and possibly absolute) strengths in others. The Williams newborn thus arrives facing distinct challenges regarding space and other abstractions but primed to process emotion, sound and language.

This doesn't mean that specific behaviors are hard-wired. M.I.T. math majors aren't born doing calculus, and people with Williams don't enter life telling stories. As Allan Reiss put it: "It's not just 'genes make brain make behavior.' You have environment and experience too."

By environment, Reiss means less the atmosphere of a home or a school than the endless string of challenges and opportunities that life presents any person starting at birth. In Williams, he says, these are faced by someone who struggles to understand space and abstraction but readily finds reward listening to speech and looking at faces. As the infant and toddler seeks and prolongs the more rewarding experiences, already-strong neural circuits get stronger while those in weaker areas may atrophy. Patterns of learning and behavior follow accordingly.

“Take the gaze,” Reiss told me. Everyone who has worked with Williams children knows the Williams gaze, which in toddlers is often an intense, penetrating eye contact of the sort described as “boring right through you.” The gaze can seem like a hard-wired expression of a Williams’s desire to connect. Yet the gaze can also be seen as a skill learned at the end of the horrible colic that many Williams infants suffer during their first year and before they start to talk well. This window is longer than that for most infants, as Williams children, oddly, start talking a year or so later than most children. It’s during this window that the gaze is at its most intense. Until she was 9 months old, for instance, Nicki Hornbaker rarely slept more than an hour at a time, and when she was quiet she tended to look vaguely at her mother’s hairline. Then her colic stopped, she started sleeping and “almost overnight,” her mother told me, “she became a happy, delightful, extremely social child, and she couldn’t get enough eye contact.” Later, when talk gave Nicki a more effective way to connect, the intensity of the eye contact eased. Nicki’s eyes now meet yours, warm and engaging, but they don’t bore through you.

To Reiss, the gaze is one of several things Williams people learn in order to pursue social connections. “They want that connection,” he said, “and they learn all these things to get it: the gaze and the gregariousness, the smiles and language and narrative skills, in succession as they’re able to. What they learn is shaped by the inclinations and abilities their genes create.

“Look at the difference between Williams kids and fragile X.” Fragile X, another developmental syndrome, produces similar cognitive defects but a pronounced social reticence or aversion to looking at faces. If a Williams wants to lock eyes, a fragile X child will literally twist himself sideways to avoid eye contact. “Nothing could be more different from a Williams,” Reiss continued. “But the thing is, fragile X kids don’t do that when they’re a year old. They’ll still look at you at that age. And Williams kids don’t have that intense gaze yet at that age. It’s only over the next year or two that they take this incredible divergence. In both cases you have a genetically inclined pattern of behavior that is reinforced.”

This is a genetic version of Bellugi’s observation that sociability drives language. The child gravitates toward the pathways that offer smoother going or more interesting experiences — at least until she finds other pathways more rewarding

(sports talk, for example). In fragile X, those pathways tend to keep a child close to himself. In Williams they lead headlong toward others.

As an experiment of nature, Williams syndrome makes clear that while we are innately driven to connect with others, this affiliative drive alone will not win this connection. People with Williams rarely win full acceptance into groups other than their own. To bond with others we must show not just charm but sophisticated cognitive skills. But why? For vital relationships like those with spouses or business partners, the answer seems obvious: people want to know you can contribute. But why should casual friendships and group membership depend on smarts?

One possible answer a comes from the rich literature of nonhuman primate studies. For 40 years or so, primatologists like Jane Goodall, Frans de Waal and Robert Sapolsky have been studying social behavior in chimps, gorillas, macaques, bonobos and baboons. Over the past decade that work has led to a unifying theory that explains not only a huge range of behavior but also why our brains are so big and what their most essential work is. The theory, called the Machiavellian-intelligence or social-brain theory, holds that we rise from a lineage in which both individual and group success hinge on balancing the need to work with others with the need to hold our own — or better — amid the nested groups and subgroups we are part of.

It started with fruit. About 15 or 20 million years ago, the theory goes, certain forest monkeys in Africa and Asia developed the ability to digest unripe fruit. This left some of their forest-dwelling cousins — the ancestors of chimps, gorillas and humans — at a sharp disadvantage. Suddenly a lot of fruit was going missing before it ripened.

To find food, some of the newly hungry primate species moved to the forest edge. Their new habitat put more food in reach, but it also placed the primates within reach of big cats, canines and other savanna predators. This predation spurred two key evolutionary changes. The primates became bigger, giving individuals more of a fighting chance, and they started living in bigger groups, which provided more eyes to keep watch and a strength of numbers in defense.

But the bigger groups imposed a new brain load: the members had to be smart enough to balance their individual needs with those of the pack. This meant cooperating and exercising some individual restraint. It also required understanding the behavior of other group members striving not only for safety and food but also access to mates. And it called for comprehending and managing one's place in an ever-shifting array of alliances that members formed in order not to be isolated within the bigger group.

How did primates form and manage these alliances? They groomed one another. Monkeys and great apes spend up to a fifth of their time grooming, mostly with regular partners in pairs and small groups. This quality time (grooming generates a pleasing release of endorphins and oxytocin) builds strong bonds. Experiments in which a recording of macaques screaming in alarm is played, for instance, have shown a macaque will respond much more strongly to a grooming partner's cries than to cries from other members of the group. The large time investment involved seems to make a grooming relationship worth defending.

In this and other ways a group's members would create, test and declare their alliances. But as the animals and groups grew, tracking and understanding all those relationships required more intelligence. According to the social-brain theory, it was this need to understand social dynamics — not the need to find food or navigate terrain — that spurred and rewarded the evolution of bigger and bigger primate brains.

This isn't idle speculation; Robin Dunbar, an evolutionary psychologist and social-brain theorist, and others have documented correlations between brain size and social-group size in many primate species. The bigger an animal's typical group size (20 or so for macaques, for instance, 50 or so for chimps), the larger the percentage of brain devoted to neocortex, the thin but critical outer layer that accounts for most of a primate's cognitive abilities. In most mammals the neocortex accounts for 30 percent to 40 percent of brain volume. In the highly social primates it occupies about 50 percent to 65 percent. In humans, it's 80 percent.

According to Dunbar, no such strong correlation exists between neocortex size and tasks like hunting, navigating or creating shelter. Understanding one another, it

seems, is our greatest cognitive challenge. And the only way humans could handle groups of more than 50, Dunbar suggests, was to learn how to talk.

"The conventional view," Dunbar notes in his book "Grooming, Gossip and the Evolution of Language," "is that language evolved to enable males to do things like coordinate hunts more effectively. . . . I am suggesting that language evolved to allow us to gossip."

Dunbar's assertion about the origin of language is controversial. But you needn't agree with it to see that talk provides a far more powerful and efficient way to exchange social information than grooming does. In the social-brain theory's broad definition, gossip means any conversation about social relationships: who did what to whom, who is what to whom, at every level, from family to work or school group to global politics. Defined this way, gossip accounts for about two-thirds of our conversation. All this yakking — murmured asides in the kitchen, gripefests in the office coffee room — yields vital data about changing alliances; shocking machinations; new, wished-for and missed opportunities; falling kings and rising stars; dangerous rivals and potential friends. These conversations tell us too what our gossipmates think about it all, and about us, all of which is crucial to maintaining our own alliances.

For we are all gossiped about, constantly evaluated by two criteria: Whether we can contribute, and whether we can be trusted. This reflects what Ralph Adolphs, a social neuroscientist at the California Institute of Technology, calls the "complex and dynamic interplay between two opposing factors: on the one hand, groups can provide better security from predators, better mate choice and more reliable food; on the other hand, mates and food are available also to competitors from within the group." You're part of a team, but you're competing with team members. Your teammates hope you'll contribute skills and intergroup competitive spirit — without, however, offering too much competition within the group, or at least not cheating when you do. So, even if they like you, they constantly assess your trustworthiness. They know you can't afford not to compete, and they worry you might do it sneakily.

Deception runs deep. In his book, "Our Inner Ape," Frans de Waal, a primatologist at Emory University, describes a simple but cruel deception

perpetrated by a female chimp named Puist. One day, Puist chases but cannot catch a younger, faster female rival. Some minutes later, writes de Waal, “Puist makes a friendly gesture from a distance, stretching out an open hand. The young female hesitates at first, then approaches Puist with classic signs of mistrust, like frequent stopping, looking around at others and a nervous grin on her face. Puist persists, adding soft pants when the younger female comes closer. Soft pants have a particularly friendly meaning; they are often followed by a kiss, the chimpanzee’s chief conciliatory gesture. Then, suddenly, Puist lunges and grabs the younger female, biting her fiercely before she manages to free herself.”

This “deceptive reconciliation offer,” as de Waal calls it, is classic schoolyard stuff. Adult humans generally do a better job veiling a coming assault. The bigger the neocortex, the higher the rate of deceptive behavior. Our extra-big brains allow us to balance bonding and maneuvering in more subtle and complicated ways.

People with Williams, however, don’t do this so well. Generating and detecting deception and veiled meaning requires not just the recognition that people can be bad but a certain level of cognitive power that people with Williams typically lack. In particular it requires what psychologists call “theory of mind,” which is a clear concept of what another person is thinking and the recognition that the other person a) may see the world differently than you do and b) may actually be thinking something different from what he’s saying.

Cognitive scientists argue over whether people with Williams have theory of mind. Williams people pass some theory-of-mind tests and fail others. They get many jokes, for instance, but don’t understand irony. They make small talk but tend not to discuss the subtler dynamics of interpersonal relationships. Theory of mind is a slippery, multilayered concept, so the debate becomes arcane. But it’s clear that Williamses do not generally sniff out the sorts of hidden meanings and intentions that lie behind so much human behavior. They would reach for Puist’s outstretched hand without hesitation.

To inquire into human behavior’s genetic underpinnings is to ask what most essentially defines us. One of the most vexing questions raised by both Williams

research and the social-brain thesis is whether our social behavior is ultimately driven more by the urge to connect or the urge to manipulate the connection.

The traditional inclination, of course, is to distinguish essential human behavior by our “higher” skills and cognitive powers. We dominate the planet because we can think abstractly, accumulate and relay knowledge and manipulate the environment and one another. By this light our social behavior rises more from big brains than from big hearts.

Andreas Meyer-Lindenberg, a psychiatrist and neurologist, sees it differently. Meyer-Lindenberg spent the last several years at the National Institute of Mental Health exploring neural roots of mood, cognitive and behavioral disorders — including Williams syndrome, which he has investigated as part of a team led by Karen Berman, a N.I.M.H. psychiatrist, clinical neurobiologist and imaging specialist. Working with Berman and Carolyn Mervis, a developmental psychologist at the University of Louisville, Meyer-Lindenberg became convinced that we may be overvaluing the cerebral.

“Cognitive social neuroscience tends to be very top-down,” Meyer-Lindenberg says. “It looks at lofty things like triadic intentionality — I’m conscious of you being conscious of me being conscious of you, things like that. Things that presuppose consciousness and elaborate intellectual procedures.” The Berman group’s work, however, was focused on brain networks operating, as Meyer-Lindenberg puts it, “at a lower hierarchical level.”

“And the most important abnormalities in Williams,” he says, “are circuits that have to do with basic regulation of emotions.”

The most significant such finding is a dead connection between the orbitofrontal cortex, an area above the eye sockets and the amygdala, the brain’s fear center. The orbitofrontal cortex (or OFC) is associated with (among other things) prioritizing behavior in social contexts, and earlier studies found that damage to the OFC reduces inhibitions and makes it harder to detect faux pas. The Berman team detected a new contribution to social behavior: They found that while in most people the OFC communicated with the amygdala when viewing threatening faces, the OFC in people with Williams did not. This OFC-amygdala connection worked normally,

however, when people with Williams viewed nonsocial threats, like pictures of snakes, sharks or car crashes.

This appears to explain the amygdala's failure in Williams to fire at the sight of frightening faces and suggests a circuit responsible for Williamses' lack of social caution. If the results hold up, the researchers will have cleanly defined a circuit evolved specifically to warn of threats from other people. This could account not just for the lack of social fear in Williams, but with it the wariness that can motivate deeper understanding. It is possible, in short, that people with Williams miss social subtleties not just because they lack cognitive tools but because they also lack a motivation — a fear of others — that the rest of us carry to every encounter. To Meyer-Lindenberg, the primacy of such circuits suggests that human sociability rises from evolutionarily reinforced mechanisms — a raw yearning to connect; fearfulness — that are so basic they're easy to undervalue.

The disassociation of so many elements in Williams — the cognitive from the connective, social fear from nonsocial fear, the tension between the drive to affiliate and the drive to manipulate — highlights how vital these elements are and, in most of us, how delicately, critically entwined. Yet these splits in Williams also clarify which, of caring and comprehension, offers the more vital contribution. For if Williams confers disadvantage by granting more care than comprehension, reversing this imbalance creates a far more problematic phenotype.

As Robert Sapolsky of the Stanford School of Medicine puts it: "Williams have great interest but little competence. But what about a person who has competence but no warmth, desire or empathy? That's a sociopath. Sociopaths have great theory of mind. But they couldn't care less."

David Dobbs writes frequently about science and medicine. His last article for the magazine was about depression.

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The Social Phenotype of Williams Syndrome

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Abstract

Williams syndrome (WS) offers an exciting model for social neuroscience because its genetic basis is well-defined, and the unique phenotype reflects dimensions of prosocial behaviors. WS is associated with a strong drive to approach strangers, a gregarious personality, heightened social engagement yet difficult peer interactions, high non-social anxiety, unusual bias toward positive affect, and diminished sensitivity to fear. New neurobiological evidence points toward alterations in structure, function, and connectivity of the social brain (amygdala, fusiform face area, orbital-frontal regions). Recent genetic studies implicate gene networks in the WS region with the dysregulation of prosocial neuropeptides. The study of WS has implications for understanding human social development, and may provide insight for translating genetic and neuroendocrine evidence into treatments for disorders of social behavior.

Introduction

Williams syndrome (WS) is a multisystem disorder [1] characterized by a distinctive social profile that holds promise for understanding the underlying neurogenetic systems that provide meaning for human social interaction. Resulting from a hemizygous deletion of ~25 genes on chromosome 7q11.23 [2**], a unique and robust behavioral characteristic of WS is an increased social drive particularly toward strangers [3, 4], manifesting as a strength in processing social over non-social stimuli, engaging language, increased social gaze, and empathic, friendly, and emotional personality [5**, 6]. This profile stands against a backdrop of strikingly uneven profile of cognitive functions, with profoundly impaired visual-spatial processing [7] (Figure 1). The neuropsychiatric profile is associated with mean IQ of approximately 50-60, with a typically higher verbal than performance IQ [8, 1]. One fascinating aspect of the WS social phenotype is that, unlike for visual-spatial processing

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with impaired functions across the board, the haploinsufficiency resulting from the gene deletion leads to a profile characterized by intriguing dissociations, or strengths and weaknesses (e.g., overly-friendly with a difficulty in making friends; socially fearless but anxious; positive affect with maladaptive behaviors). In this sense, the WS gene deletion provides a unique model system to begin to relate single/clustered genes to specific alterations at the phenotypic level, with the ultimate potential of advancing our understanding of human social behavior at multiple levels.

This review focuses on capturing the nature of the unique WS social profile by outlining its major features at the level of behavior, followed by recent advances in the study of brain and genes. While the literature on the WS social phenotype has been building up for some time, the syndrome is emerging newly into focus and gaining new interest due to a recent surge of neurobiological evidence suggesting a consistent profile of brain structure and function underlying the social profile. Subsequently, the studies have provided critical new information about the “social brain”, paving the way for WS to serve as a “prototype model” of social functioning that will allow new insight into understanding the biological basis of aspects of human social behavior in the future. We finish by addressing entirely new directions in molecular genetics suggesting dysregulation of prosocial neuropeptides in the overly social phenotype of WS, thereby implicating the study of WS prosocial behavior to encompass neuroendocrinology for the first time.

Gregarious personality, affiliative drive, and compromised social relationships

Studies of children and adults with WS highlight strikingly consistent and unique patterns of behavior both at the cognitive level [6] and in terms of sociability [5**]. The social behavior in WS also appears distinct from typical uninhibited behavior [9*]. Accumulating evidence utilizing an array of methodologies (questionnaires, observations, experiments, self- and other reports, event related potentials (ERP), and more recently psychophysiology) has revealed increased appetitive drive toward social engagement and heightened approachability towards strangers as some of the core features of the WS social phenotype [3, 4, 10, 11]. Individuals with WS typically demonstrate an overly friendly, affectionate, engaging, and socially disinhibited personality [6, 12]. An empirically derived personality profile of WS has been constructed based on the Children's Behavior Questionnaire (CBQ) and the Multidimensional Personality Questionnaire (MPQ), reflecting Rothbart's psychobiological approach to temperament and Tellegen's Three-Factor Model of personality, respectively [6]. The findings showed that the personality characteristics that distinguished individuals with WS from those with intellectual disabilities of mixed etiology with 96% sensitivity and 85% specificity included a lack of shyness and high empathy. In addition, individuals with WS were uniquely gregarious, people-oriented, visible, tense, and sensitive/anxious. The characteristic WS sociability may further be characterized by an attraction to strangers [4], a propensity to direct eye contact [13] and a bias toward focusing on the faces and eyes [14, 15], abnormally expressive language [16], a penchant for positive affect, evident in both receptive and expressive functions [5**, 17], and insensitivity to negative emotional signals [18], suggesting social fearlessness. The profound interest in

unfamiliar people is observable from infancy (Figure 2), and is exhibited also by the lack of separation/stranger anxiety shown by children with WS when separated from their parents [19**].

The excessive sociability of WS encompasses the domain of language. Reilly and colleagues [16, 5**] analyzed narratives of individuals with WS, Down syndrome, specific language impairment, focal lesions, and age-matched typical controls for social-affective language and formal grammatical competence. Social-affective language characteristics pertain to language reflecting the narrator's attitude or perspective, including attributing emotions or motivations to characters, using intensifiers (really, very, so) and sound effects, direct quotes, and character speech, and tools for “hooking” the listener's attention. While individuals with WS significantly exceeded all other populations tested in their use of socially engaging language, their level of grammatical competence was similar to those with specific language impairment [15]. This robust finding has been replicated across development and across different cultures in WS [5**]. In addition to language, the effect of WS hypersociability is also evident cross-culturally [20], even though at the same time, culture subtly mediates the genetic expression of social behavior in WS (American vs. Japanese, French, and Italian).

The increased sociability has been observed with remarkable consistency in WS across different measures and ages, as the broad literature to date attests. A central focus of our program of studies has been to examine the variability and consistency of social-affective behavior of WS from a developmental perspective. As described later, it is particularly useful to examine the heterogeneity in social behavior in WS through the prism of genetic and neural variance. One part of this effort at the behavioral level included creating a new measure designed to tap onto central issues in quantifying social and affective behavior characteristic of WS, entitled The Salk Institute Sociability Questionnaire (SISQ) [3, 20, 21]. The SISQ has been widely used to examine social behavior across the lifespan, cultures, and populations (WS, autism, Down syndrome, and typical development) [3, 20, 21]. Our data from over 200 individuals with WS of ages 1-52 years on the SISQ consistently show that individuals with WS are characterized by higher global sociability and approachability toward strangers as compared to any control group. Moreover, the WS group is associated with reduced variability with respect to social-affective behaviors relative to the comparison groups. Thus, the distinctiveness of the social behavior in WS appears to be intimately linked to their engagement with, and approachability toward, unfamiliar people. Indeed, the relative homogeneity of the etiology of WS together with the diminished variability with respect to social behavior lends the syndrome ideally to the study of genotype-phenotype relations with respect to social-affective behavior.

The social behavior of individuals with WS is however often inappropriate and is accompanied by marked deficits in social skills, such as difficulties in social adjustment, social judgment, with an inflexible, repetitive, and pragmatically insensitive social repertoire [22, 23, 24]. This paradoxical profile has been characterized as an excessive desire to approach others, an overly friendly and engaging personality, coupled with an inability to sustain friendships, with particular difficulties in peer relations. Combined with limitations in intellectual, cognitive, and motor functions [1], the excessively friendly social profile of

WS predisposes such individuals to social vulnerability, such as risk of social isolation, difficulties in employment, bullying, abuse, and erratic relationships [25]. In addition, it is noteworthy that the characteristic social-emotional behavior of WS also coexists in the context of diagnostically significant anxiety disorders [26, 27, 23] as well as specific attentional difficulties [24, 26]. The distinct paradoxes and dissociations of the WS social profile, including the anxieties, may be accountable by the level of intellectual function. Taken together, WS behavior includes a nuanced spectrum of distinct socially positive and maladaptive behaviors, which are unlike those seen in typical extraversion, and imply the dysregulation of multiple brain circuits.

Salience of faces

Given that abnormalities in the perception and responsivity to faces are primary contributors to social dysfunction, studies have begun to address the increased attention to faces in WS, and its relation to the “hypersocial” phenotype. Individuals with WS exhibit a significant interest in face stimuli across development (Figure 2) [13, 20], and spend more time focused on faces than on non-social stimuli [28]. Subsequently, WS is characterized by a dissociation such that those with the syndrome show better processing of social than non-social affective stimuli [29, 30], which may result from the early bias toward social information, leading to enhanced processing of such stimuli at the expense of non-social information. Recently, eye tracking studies have quantified the earlier observations of the remarkable early attentional bias toward faces [5**, 13, 20] showing that individuals with WS fixate longer on faces [14, 15] and eyes [31] than controls, and once fixated, they show delays in disengaging [31, 32].

A new line of research for WS focusing on autonomic nervous system responsivity has suggested that atypically low general arousal level [33] may contribute to the exaggerated eye contact in individuals with WS [34]. At the same time, WS is associated with increased heart rate reactivity and a lack of electrodermal habituation to faces, indexing increased arousal to such stimuli [30]. Thus, a lack of habituation to faces may be linked to the increased affiliation and attraction to faces characterizing the syndrome, as face stimuli may appear unusually novel to individuals with WS.

The emotional phenotype

Studies of basic emotion processing have revealed a markedly uneven profile in WS, with decreased recognition of negative social signals within both visual and auditory domains by such individuals [e.g., 35], which has been hypothesized to contribute to the increased approachability and inappropriate social engagement [36]. However, this combines with a distinct attentional and processing bias toward positive social stimuli [17], and a preserved ability to process positive affect [29, 35, 37]. Reflecting the positive bias, individuals with WS also tend to perceive unfamiliar faces abnormally positively [4]. In contrast, individuals with WS show difficulties in attending to [18] and recognizing [17] angry faces, and demonstrate delays in identifying negative facial expressions [38].

An important aspect of the WS emotional profile pertains to reports of increased emotional responsivity, including enhanced empathic display and reaction [5**, 13]. Specifically,

increased emotional reactions in individuals with WS have been described in relation to their interactions with other people [12, 16] and the experience of music [39]. Evidence suggests that there are two systems for empathy: a basic perceptually-based emotional contagion system (involving the mirror neuron system), and a more advanced cognitive perspective-taking system. Studies have already established that individuals with WS show difficulties in cognitive aspects of empathy, e.g., theory of mind, which is not surprising given their level of cognitive function. Thus, the characteristic profile of WS of increased emotional reactivity and social affiliation in the context of poor social intelligence is mirrored by relatively less severely impaired social-perceptual aspects of "theory of mind", as indexed by performance in standard emotion processing tasks as compared to the more profound impairments in the higher-order social-cognitive functions, as indexed by performance in mentalizing tasks [see 12]. This pattern of processing has resulted in the postulation of the dual-component model of theory of mind [12]. Interestingly, in children with WS, difficulties in interpreting social dynamics in ambiguous situations, i.e., in the context of the social attribution task, correspond to deficits in reciprocity in real-life social interactions [40]. Taken together, this suggests that performance of individuals with WS on artificial theory of mind tasks may translate to aberrant social skills in real-life settings.

Emotional functioning thus represents an another area characterized by "peaks and valleys" of ability within the WS social profile, and raises questions regarding the underpinnings of this behavior, such as, whether the unusual emotional reactivity characterizing WS may be associated with over-activity in the traditional empathy or mirror neuron system circuits. A recent study with potential implications for mirror neuron system function found that individuals with WS perform below mental age level in tasks tapping on the understanding of motor acts (the "what" aspect not involving intention). At the same time, their understanding of a motor intention (the "why" aspect implicating intention reading) is mental age appropriate [41]. This may provide insight into the empathic functions in WS.

Taken together, studies have revealed a profile of "dissociations" characterizing the WS social phenotype: the overdrive for social interaction and increased emotional responsivity on one hand, and clear limitations in social intelligence and related cognition on the other, raising intriguing questions regarding the pathways resulting in the characteristic profile. The bulk of behavioral literature sets the stage for the quest for the neurobiological and genetic underpinnings of the WS social phenotype.

The social brain

While the bulk of neurobiological literature on WS indicates diffuse abnormalities in the social brain [42**], at the same time, it paints a picture of brain structure and function that closely mirrors the excessively social and emotional behavioral profile of WS. Specifically, data are beginning to suggest that socially relevant structures are disproportionately enlarged in WS [42**, 43]. Conversely, there are both structural and functional alterations in the dorsal visual processing stream [43, 44]. Reflecting the increased use of language for social purposes [16, 5**] described earlier in relation to the WS personality, larger volumes of the ventral-orbital prefrontal region have been associated with greater use of social-affective language in individuals with WS [45]. Moreover, new evidence of language-associated brain

activity patterns as measured by event related potentials (ERP) reveals that individuals with WS show the largest, and those with autism the smallest, N400 ERP component [46*], which in healthy individuals indexes sensitivity to the semantic aspects of language. The N400 amplitude correlates with approachability in individuals with WS only, suggesting that the atypical neural processing of language may be instrumental to their social drive [47]. Thus, neurobiological studies are beginning to uncover neural correlates underlying aspects of the social-emotional phenotype of WS.

Additional ERP evidence suggests that in WS, relatively good behavioral performance on tasks of face processing is sustained by abnormal brain activity. For example, on a facial identity judgment task, while age-matched individuals with WS and typical controls showed similar behavioral performance, individuals with WS relative to controls showed abnormal ERP activity within the first 200 ms post-stimulus [48], namely a smaller N100 component and a markedly larger N200 (both index perceptual and attentional processes in healthy individuals) (Figure 3). The abnormally large N200 in WS is thought to reflect increased attention to faces. Since the small N100/large N200 pattern has not been observed in any other population studied (e.g., typical development, autism, specific language impairment), in either adults or children, this pattern is likely to reflect a WS specific ERP signature indexing increased attention to human faces [48]. Additionally supporting the interest in processing faces, magnetic resonance imaging (MRI) studies have revealed greater grey matter thickness and density of the fusiform gyrus in individuals with WS relative to typical controls [42**, 43]. The volume of the fusiform face area (FFA) is also enlarged in WS, with the functional volume correlating positively with face processing accuracy [49*]. The disproportionately large FFA in WS may reflect abnormally rapid specialization and development of the face sensitive regions of the FFA due to the robust attentional bias toward such stimuli beginning in early childhood [42**].

The overly sociable and emotional aspect of the WS phenotype is captured by findings showing that WS is associated with enlarged total amygdala volume relative to typical controls [43], and this correlates with ratings of approachability in response to images of facial expressions of unfamiliar people [50]. Further, individual differences in amygdala response to social threat has also been linked to approachability toward unfamiliar people in WS [51]. Functional MRI (fMRI) studies indicate that individuals with WS show reduced amygdala and orbitofrontal cortex (OFC) activation in response to threatening faces as compared to typical controls [36, 52]. Additionally, recent combined ERP and fMRI evidence shows that while brain responses to negative facial expressions are attenuated in WS, neural activity to happy faces is enhanced as compared to typical [52]. Combined, these findings may thus be linked to the insensitivity to negative social signals, abundance of positive affect, and bias toward attending and processing of positive emotion characterizing individuals with WS. Meyer-Lindenberg et al. [36] also reported aberrant amygdala-prefrontal interactions in WS during the processing of threatening faces, which was hypothesized to relate to the non-social anxiety, diminished social fear, and increased affiliation characterizing the syndrome.

An important brain structure linked to empathy, emotional responsiveness, and personality is the insula [53]. A recent study reported a global reduction in dorsal anterior insula volume,

together with compromised connectivity between the insula, amygdala, and OFC, in individuals with WS [54*]. Moreover, structural and functional alterations in the anterior insula predicted the extent to which the participants displayed the distinct hypersocial, empathic, and anxious WS personality, suggesting a genetic insula-mediated mechanism underlying the social-behavioral phenotype of WS. Taken together, the neurobiological literature is providing important clues with respect to potential substrates underpinning the unique dimensions of the WS social profile outlined earlier at the behavioral level. However, the evidence also raises questions, such as whether the insatiable drive for social interaction may be related to alterations in the reward regions/circuits of the brain in WS, and whether the increased attraction and attention to faces may be associated with enhanced OFC-FFA connectivity in WS, which will require disentanglement in future studies.

Genetics and hints toward new directions

Despite being a highly heritable disorder of social dysfunction, the genetic underpinnings of autism remain largely unknown [55*], and thus direct genotype-phenotype correlations are highly elusive. By contrast, the well-documented hemizygous deletion of ~25-28 genes on chromosome 7q11.23 that results in WS [2**] is present in ~98% of diagnosed individuals. The social profiles of WS and autism characterized by hypersociability and social avoidance respectively may appear at the first glance as polar opposites, suggesting that parallel study of the disorders may be particularly informative and attractive in an effort to unravel the neurogenetic bases of social function. However, as phenotypes are by a definition a collection of behavioral symptoms, and because their developmental trajectories are a mixture of environmental and biological influences, linkages with genetic data in the context of cross-syndrome comparisons are not straightforward. This highlights the fact that elucidating the genetic bases of social-affective behaviors is a formidably complex task, which however is now becoming possible to tackle.

In WS, focusing on the effects of the specific genes on behavior, a major avenue for addressing gene-behavior relationships involves characterizing the rare ~2% of diagnosed individuals associated with genetic variance from the typical deletion. Korenberg and colleagues [3] reported an important case whose deletion spares GTF2I but not GTF2IRD1, and this participant shows atypical social behavior for WS by appearing socially inhibited, i.e., shy, with severely compromised visual-spatial abilities. This evidence implicates the deletion of GTF2IRD1 and GTF2I in the network of genes and transcription factors underlying WS sociability and cognition.

Thus, although such studies are still scarce, the comparison of the characterizations of individuals with full deletions with those of the cases with atypically sized deletions is helping to parse the WS phenotype by highlighting the contributions of specific genes to observed behavior [2**, 3]. In a recent example, Karmiloff-Smith and colleagues [56] reported two small deletion cases, a female with 24 genes deleted sparing the four telomeric genes in the WS region, and a male with only the four telomeric genes deleted. Although both cases exhibited social deficits, the male showed an autistic-like socially inhibited profile, whereas the social behavior of the female resembled that typically observed in WS, including low levels of shyness and increased positive affect. At the same time, relative to

the full deletion WS profile, detailed neurocognitive assessments of the two cases revealed complex, divergent and convergent patterns of function, highlighting the challenging nature of genotype-phenotype studies.

A new research strategy attempting to understand the genetic mechanisms associated with complex disorders such as autism and WS has focused on copy number variants (CNVs). Here, a well-defined cluster of genes deleted or duplicated along a chromosome is studied in disorders of, e.g., social function, to pinpoint both discrete and interacting genes impacting brain development and organization.

As opposed to autism, given the strength and consistency of the hypersocial phenotype in WS, the relatively small cluster of dosage-sensitive genes deleted in WS appears vital for social-emotional and visual-spatial functions. A recently identified 7q11.23 duplication syndrome is associated with separation anxiety disorder and/or social phobia; features that are not only typically absent, but contrary in individuals with WS [19**]. Interestingly, spontaneous duplication of the 7q11.23 has recently also been linked to autism [55*]. As WS and autism present highly contrasting profiles of social motivation and social-interactive behavior, this further suggests both the dosage-sensitivity and significance of these genes in social behavior. Consistent with this notion, an association between variants in GTF2I and profound social impairments and increased repetitive behaviors was recently reported in autism [57].

Some of the WS region genes have been studied in knock out mice although the application of animal models to the understanding of human disease is not straightforward [56]. In one study, two mutant lines of mice were generated with deletions of the region syntenic to the human WS region [58*]. Elevated sociability and fear response characterized the proximal deletion line missing genes from GTF2I to LIMK1, whereas cognitive deficits were associated with the distal deletion line lacking genes from LIMK1 to FKBP6. As several key behaviors characterizing the WS phenotype were successfully replicated in mice, the animal model may provide important clues regarding the genes and gene networks related to complex neurobehavioral mechanisms in humans.

An exciting experimental study published this year by Korenberg et al. provided powerful new clues with respect to the effects of specific genetic information deleted in WS on neuroendocrine function in individuals with WS. Critically focusing on the endogenous as opposed to exogeneous exposure to neuropeptides, this study leads to the hypothesis that dysregulation of prosocial neuropeptides may underlie the increased social-affective behavior in WS [59**]. Oxytocin (OT) and arginine vasopressin (AVP) are thought to play a key role in human social behavior; e.g., exogeneous exposure to OT has been associated with increased eye contact, trust, and sensitivity to others' emotion [60**], although there still remains controversy surrounding the effects of OT and AVP in humans. OT is suggested to impact social-emotional behavior by acting upon distributed limbic and paralimbic regions; however, the neuropeptide targets and central neural circuits are unknown in humans [61, 62]. Most notably, OT modulates the fear response by acting upon the amygdala by attenuating its activation and its connectivity with the brainstem [62]. In contrast to studies using intranasal OT, Dai et al. [59**] sought to determine the potential

effects of altered baseline and/or release levels on social behavior using WS as a model. The study reported increased basal OT levels and peak release of both OT and AVP in response to positive emotional (favorite music) and negative physical (cold) stimulation in individuals with WS relative to typical controls. In WS, baseline OT level further correlated positively with approach, but negatively with adaptive social behaviors. This is the first powerful data implicating a biological mechanism that may underlie the paradox of increased social affiliation coupled with poor social relationships, anxiety, and some other social disturbances in WS. This new evidence raises questions of whether the increased release of OT and AVP may act on specific amygdalar regions to contribute toward increased eye contact, approachability, and attention to faces in WS; whether endogenous variation of OT and AVP may be implicated in aspects of the altered social-emotional behavior characterizing WS; and whether the WS gene deletion may be linked to disturbances in the release of both OT and AVP. Taken together, the diverse strands of evidence discussed in this article distinguish WS as an attractive candidate for an integrated approach toward elucidating the neural and genetic determinants of human social behavior (Figure 4). Fascinating clues integrating cross-level data are just beginning to emerge from WS [59**] and autism [61], which will be central to the novel efforts of elucidating the neuroendocrinology of the social brain.

Conclusions

WS is associated with a clearly defined genetic basis, combined with an unusual, distinctive social phenotype, thereby providing an attractive model for the basis of a new approach to social neuroscience. Individuals with WS exhibit consistent and unique patterns of social behavior, characterized by an overly friendly, affectionate, engaging, and socially disinhibited personality particularly toward strangers, apparent cross-culturally, and through separable channels of communication, such as eye gaze and language. The neurobehavioral mechanisms linked to the WS social profile highlight parallel profiles of exaggerated/preserved function, suggesting alterations of the amygdala, FFA, and connectivity between brain regions subserving social-emotional processing, which confer to the WS social phenotype characterized by non-social anxiety, increased approachability, emotional responsivity, and empathy. Recent advances in molecular genetics have provided initial clues suggesting that the relatively small dosage-sensitive cluster of genes at 7q11.23 is implicated in social-affective functions, with the hemideletion characterizing WS resulting in overly social behavior, and interestingly, a duplication causing a socially withdrawn and anxious profile. A most intriguing new finding suggested the role of the WS gene deletion in the dysregulation of the prosocial neuropeptides, OT and AVP, for the first time, potentially implicating them in the altered social-emotional behavior of WS. This work underscores the need for future research to be directed on the mechanistic effects of OT and AVP on the social brain circuitry [60**, 61].

The diverse approaches described earlier in this article directed at unraveling the complex issues tapping onto genetics of social behavior have just commenced the journey toward elucidating the multidimensional nature of social behavior and its widespread disruptions in psychiatric disorders. Although not straightforward, the parallel study of WS and autism characterized by contrasting social phenotypes may be valuable in illuminating shared

neurogenetic mechanisms underlying social functions. In the long run, these efforts promise to provide insight into the neurodevelopmental mechanisms that shape human social abilities in general.

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Highlights

- WS serves as an excellent model for linking genes, neural systems and social phenotype.
- The key dimensions of WS sociability include increased approachability, attention to faces, and emotional responsivity.
- Hypersociability combines with altered structure and function of the social brain in WS.
- Genes at 7q11.23 are implicated in social-affective functions.
- The WS gene deletion is linked to dysregulation of prosocial neuropetides oxytocin (OT) and arginine vasopressin (AVP).

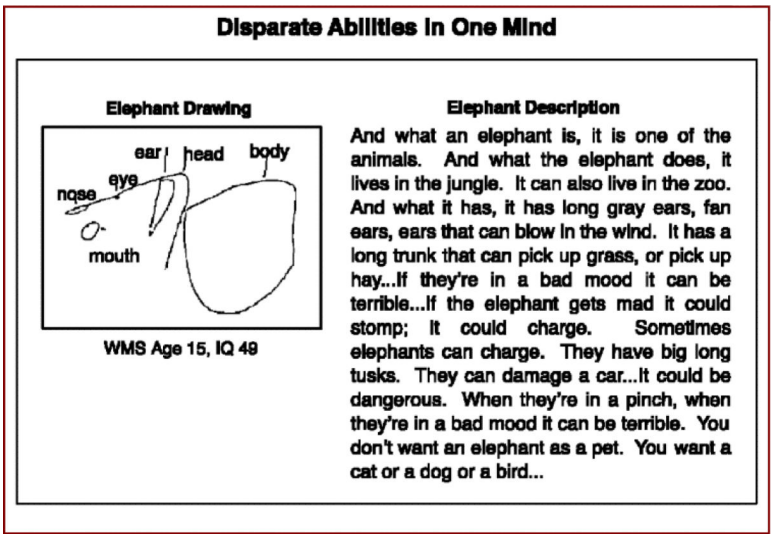

Figure 1.

Peaks and valleys of cognitive ability: dissociation of visual-spatial and language (social) functions in WS.

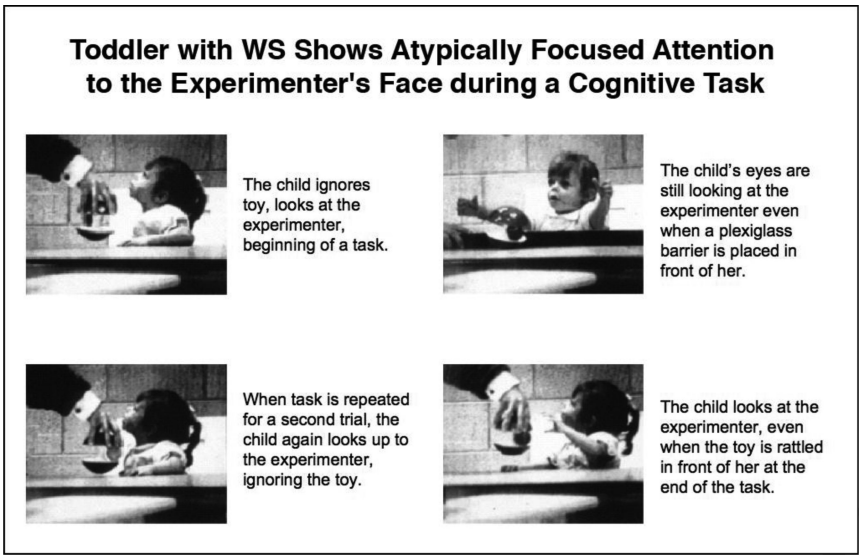

Figure 2.

A preoccupation with a stranger (experimenter) by a child with WS interferes with task administration.

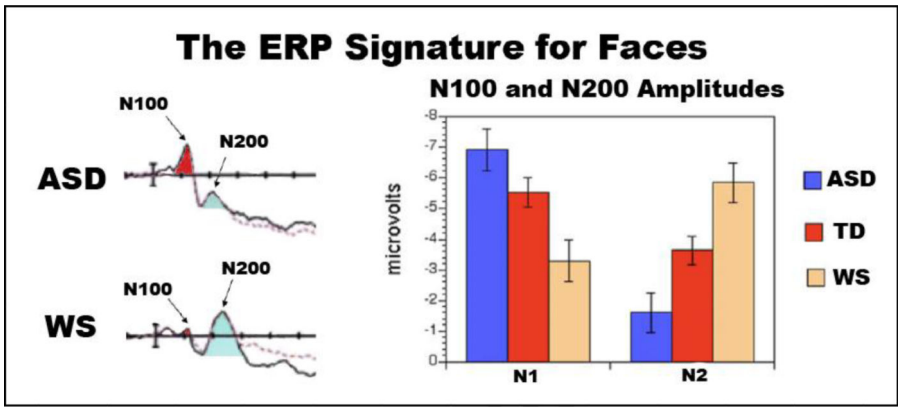

Figure 3.

ERP signature indexing converging profiles of attention to faces in WS (increased) and autism (decreased) relative to typical development (TD).

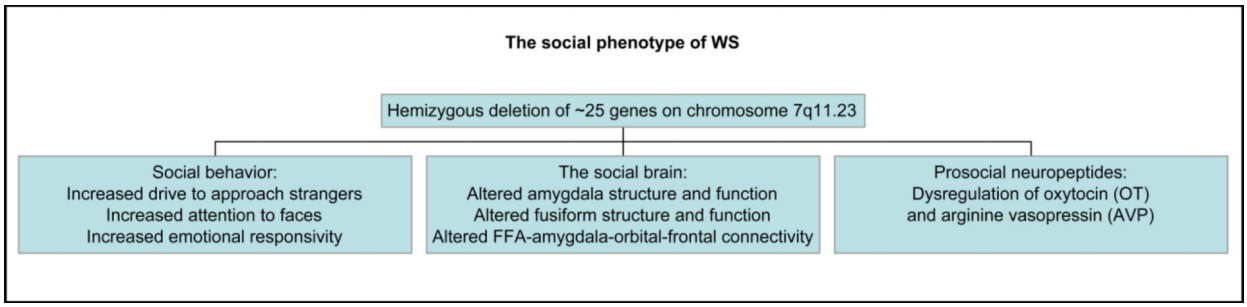

Figure 4.
Summary of the key dimensions of the social phenotype of WS.

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Research Report

Comprehension of sarcasm, metaphor and simile in Williams syndrome

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Abstract

Background: Although people with Williams syndrome (WS) are often characterized as friendly and sociable with relatively good general language abilities, there is emerging evidence of pragmatic difficulties and trouble comprehending aspects of non-literal language.
Aims: The main aim was to investigate the comprehension of sarcasm, metaphor and simile in WS relative to typically developing controls. A secondary aim was to examine the association between non-literal language comprehension and a range of other cognitive abilities, both in WS and in the typically developing population.
Methods & Procedures: Twenty-six participants with WS were compared with 26 typically developing chronological age-matched controls (TDCA) and 26 typically developing mental age-matched controls (TDMA). Participants listened to stories in which characters made non-literal comments. They were then asked what each character meant by their comment. In order to investigate the second aim of the study, cognitive abilities were also assessed using the Woodcock–Johnson (Revised) Tests of Cognitive Ability, including expressive vocabulary, verbal working memory, perceptual integration, inferential reasoning and overall cognitive ability.
Outcomes & Results: Comprehension of non-literal language in WS was significantly below TDCA levels, but was not significantly different to TDMA levels. For typically developing controls, each of the cognitive measures was strongly correlated with each of the measures of non-literal language comprehension. The same relationships were not always found for participants with WS. In particular, sarcasm comprehension in WS was not significantly correlated with any of the assessed cognitive abilities, and expressive vocabulary was not significantly correlated with any measure of non-literal comprehension.
Conclusions & Implications: Comprehension of simile in WS is below TDCA levels but seems on par with their mental age level. It appears that comprehension of sarcasm and metaphors is above the cognitive capabilities and mental age level of most individuals with WS. Further, the pattern of correlations between non-literal comprehension and cognitive abilities in WS relative to controls suggests that perhaps the linguistic and cognitive systems that underpin non-literal language comprehension in typically developing individuals interact and integrate in different ways in WS.

Keywords: Williams syndrome, sarcasm, metaphor, simile, cognition.

What this paper adds?
The comprehension of non-literal language in Williams syndrome (WS) is poorly understood. By individually pairing participants with WS to typically developing controls matched for either mental age or chronological age, and examining the associations between comprehension of non-literal language and other cognitive abilities in both WS and typically developing controls, this study fundamentally extends current knowledge of comprehension of non-literal language in WS. The study shows that comprehension of simile in WS is below the levels expected for their chronological age, but seems on par with their mental age level, whereas comprehension of sarcasm and metaphor is above the cognitive capabilities and mental age level of most individuals with WS. Further, the pattern of associations between non-literal language comprehension and cognitive abilities is different in WS and in typically developing controls, suggesting that individuals with WS arrive at correct interpretations of non-literal language in different ways. These findings have implications for social interactions with people with WS.

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Introduction

Non-literal language refers to words, or groups of words, that exaggerate or alter the dictionary-defined meanings of the component words. There are many non-literal language devices common in everyday communication. For example, sarcasm conveys an idea by saying the opposite. Metaphor and simile draw on the similarity between objects or concepts to convey meaning. Comprehension of non-literal language can be thought of as a subset of pragmatic competence, because the listener must interpret the language in relation to the context in which it occurs (Baron-Cohen 2001, Bishop 1997).

Non-literal language comprehension is reported to be impaired in a wide range of developmental disorders such as the autism–spectrum disorders (Baron-Cohen 1997, Happé 1993, Happé and Frith 1996) and language-based learning disabilities (Cain *et al.* 2005, Qualls *et al.* 2004), and in patients following acquired brain injury such as stroke, patients with right hemisphere damage (McDonald 1992, McDonald and Pearce 1996, Pearce *et al.* 1998), and patients who have sustained a traumatic brain injury (Dardier *et al.* 2011, Hirst *et al.* 1984, Kaplan *et al.* 1990, Weylman *et al.* 1989, Winner and Gardner 1977). The main aim of the present study was to explore non-literal language comprehension in the developmental disorder known as Williams syndrome (WS).

Williams syndrome

WS is a rare neurodevelopmental disorder caused by a micro-deletion on chromosome 7 (Ewart *et al.* 1993). The WS phenotype is associated with medical complications, a specific set of facial features, a mild to moderate intellectual impairment, and outgoing social behaviour (Bellugi *et al.* 2000, Jones *et al.* 2000, Mervis and Klein-Tasman 2000). There is an extensive body of research looking at language abilities in WS, which has been reviewed in detail elsewhere (e.g. Brock 2007, Mervis 2009). In brief, at the group level, Brock (2007) reported that studies typically show an advantage for verbal abilities over non-verbal abilities in WS (Dall'Oglio and Milani 1995, Grant *et al.* 1997, Howlin *et al.* 1998, Levy and Bechar 2003, Pagon *et al.* 1987, Udwin and Yule 1990). In terms of specific language abilities, Mervis (2009) concluded in a review that at the group level receptive concrete vocabulary and phonological processing are relative strengths in children with WS, whereas relational vocabulary, grammatical comprehension, verbal working memory, comprehension monitoring and discourse-level processing were relative weaknesses.

Based on this apparent strength in verbal abilities coupled with their sociable personalities, one may expect pragmatic language skills to be a strength in WS. In contrast, however, as Mervis highlights, some aspects of language are impaired in WS relative to their overall mental age and, in addition, people with WS are often reported to experience social difficulties in day-to-day functioning with their peers, such as difficulties with collaborative conversation, appropriate expression of subjective views and feelings (Lacroix *et al.* 2007), and maintaining friendships (Laws and Bishop 2004). Based on the latter findings, one might expect non-literal language comprehension to be impaired in WS.

Non-literal language comprehension in WS

Despite the extensive body of research looking at language and social abilities in WS, there has been surprisingly little research published on comprehension of non-literal language in WS and the findings remain mixed. A recent systematic review (Godbee and Porter 2012) identified just five studies looking at non-literal language comprehension in WS. These studies employed a variety of measures of non-literal language comprehension as well as different comparison groups and different measures of cognitive ability, making it difficult to draw conclusions based on the extant literature regarding whether non-literal language comprehension is impaired in WS and which cognitive abilities best predict non-literal language capabilities. For example, one study looked only at children under the age of 13 (Annaz *et al.* 2009), two studies looked at children and adolescents under the age of 18 (Lacroix *et al.* 2010, Sullivan *et al.* 2003), and one study looked at adolescents and adults (Bertrand *et al.* 1995). The remaining study (Thomas *et al.* 2010) recruited a broad sample including children, adolescents and adults. The number of participants with WS in these studies ranged from ten to 24 participants, covering a wide range of mental ages. None of the studies matched groups on mental age individually by participant.

Godbee and Porter's (2012) review suggested that comprehension of non-literal language in people with WS may be impaired relative to comparison groups for some forms of non-literal language but not others. Metaphor comprehension (Annaz *et al.* 2009), perceptual simile comprehension (Thomas *et al.* 2010) and idiom comprehension (Lacroix *et al.* 2010) were poorer in WS than in typically developing controls matched for mental age, whereas metonym comprehension and functional simile comprehension were at mental-age levels. Participants with WS performed similarly to children with Prader–Willi syndrome and unspecified mental retardation in terms of discrimination of jokes and lies (Sullivan *et al.* 2003). This pattern suggests that some aspects of non-literal language (e.g. metonymy, functional similarity) are at mental age levels, whereas other aspects of non-literal language (e.g. metaphor, idioms)

are impaired. In some studies, the ability to interpret aspects of non-literal language in WS was related to conservation ability (Bertrand *et al.* 1995), receptive vocabulary (Annaz *et al.* 2009) or verbal IQ (Lacroix *et al.* 2010, Thomas *et al.* 2010). There was also evidence, however, of non-significant associations between non-literal language comprehension and other cognitive abilities in WS. For example, Annaz *et al.* (2009) found no significant relationship between non-literal language comprehension in WS and pattern construction ability (a measure of visuo-spatial ability). Similarly, Sullivan *et al.* (2003) found no significant relationship between non-literal language comprehension in WS and receptive vocabulary, second-order theory of mind or overall IQ. However, these studies may have been underpowered to find significant associations between non-literal language comprehension in WS and other cognitive abilities, recruiting just ten (Annaz *et al.* 2009) and 16 (Sullivan *et al.* 2003) participants with WS, respectively.

Only three of the above studies commented on the relationship between non-literal language and chronological age or cognitive ability in typically developing controls. Annaz *et al.* (2009) reported a correlation between chronological age and comprehension of both metonyms and metaphors in typically developing children. Verbal mental age in typically developing children was correlated with comprehension of both idioms (Lacroix *et al.* 2010) and perceptual and functional similes (Thomas *et al.* 2010).

Cognitive associations

Given the limited research to date, especially regarding the association between non-literal language comprehension and cognitive abilities in WS, it is necessary to turn to the wider literature to help generate hypotheses about non-literal language comprehension in WS.

While impairments in the comprehension of non-literal language comprehension can occur independent from other cognitive abnormalities, understanding non-literal language (like any aspect of pragmatic competence) also involves the interaction and integration of a range of linguistic and cognitive systems. Functionality of cognitive systems such as vocabulary knowledge, verbal working memory, perceptual integration, and inferential reasoning can impact on the comprehension of non-literal language. While this is not an exhaustive list of contributing systems, these four systems are commonly cited as relating to non-literal language comprehension in the literature (Burgess and Chiarello 1996, Perkins 1998, 2007).

For example, to interpret non-literal comments correctly, individuals need to have a sufficiently well-developed vocabulary to comprehend the terms used in non-literal comments, as well as the terms in any contextual information.

Verbal working memory capacity defines the amount of linguistic material that can be held in mind and processed at a given time. If verbal working memory is impaired, a listener may in effect be working from incomplete contextual information and so may make incorrect inferences about non-literal language (Perkins 2007).

It is not only poor short-term memory that can lead to an individual failing to take in all of what she hears. A broader deficit in attending to and integrating context when deriving meaning, known as 'weak central coherence' (Martin and McDonald 2003, 2004), can also account for poor understanding of non-literal language. Individuals who attend to small pieces of information rather than large, globally coherent patterns of information may not be able to rely on structural coherence to aid processing.

Inferential reasoning, an aspect of higher-order executive functioning is the ability to make a judgment on the basis of context and prior information through abstracting and integrating information across time and updating knowledge based on new information (Keil *et al.* 2005). The final judgment is a choice between two or more alternative judgments. It follows that inferential reasoning is key to the comprehension of non-literal language, as the listener must choose between the literal and non-literal interpretation of comments, and in some cases between more than one possible non-literal interpretation.

The wider literature examining the development of comprehension of non-literal language in typically developing children suggests that the ability to interpret accurately non-literal language indeed develops in parallel with these cognitive systems, with some comprehension of non-literal language evident in children as young as 4 years of age and continuing to develop throughout childhood and early adolescence (Andrews *et al.* 1986, Bernicot *et al.* 2007, Demorest *et al.* 1983, 1984, Happé 1993, 1994, Leekam 1991, Pexman and Glenwright 2007, Sullivan *et al.* 1995, Winner 1988, Winner and Leekam 1991).

Aims and predictions of the current study

In light of the above, the current study aimed to compare the comprehension of sarcasm, metaphor and simile in WS relative to both typically developing chronological age-matched controls (TDCA) and typically developing controls matched on mental age (TDMA).

Based on the limited findings to date, we expected to find that non-literal language comprehension would be significantly poorer in WS than in TDCA and TDMA controls, particularly the understanding of metaphor

and sarcasm, which are developmentally more advanced than the understanding of simile (Demorest *et al.* 1983, 1984). Based on previous findings, we predicted that simile comprehension would be at MA levels.

A secondary aim was to examine the relationship between non-literal language comprehension and a wide range of cognitive abilities including vocabulary knowledge, verbal working memory, perceptual integration, inferential reasoning and general cognitive ability, both in typically developing controls and in People with WS. Based on the association between these cognitive systems and non-literal language comprehension within the wider literature, and the little research undertaken in this area in WS, we hypothesized that non-literal language comprehension would be significantly correlated with vocabulary knowledge, verbal working memory, perceptual integration, inferential reasoning and general cognitive ability, for both typically developing controls and participants with WS.

Methods

Participants

Twenty-six participants with WS (12 males) were recruited through the Williams Syndrome Associations of New South Wales (NSW) and South Australia (SA). All participants with WS were diagnosed independently by a minimum of two health professionals (e.g. cardiologists, ophthalmologists, geneticists, paediatricians) based on a combination of unique facial, physical and behavioural characteristics associated with the syndrome (McKusick 1988, Morris and Sigman 1988). All WS diagnoses were confirmed by genetic FISH testing which showed the characteristic elastin gene mutation. The average IQ of the participants with WS was 46.9, consistent with findings from a recent systematic review (Martens *et al.* 2008), which indicated that the average global full scale IQ score for participants with WS typically fell within the mild to moderate range.

Twenty-six typically developing controls individually matched to the WS participants by chronological age were recruited through state schools in NSW or through a first-year psychology subject pool at Macquarie University. Twenty-six typically developing controls individually matched to the WS participants by mental age were recruited through state schools in NSW. No control participant had a positive history for neurological or psychological disorders, intellectual impairment, learning difficulties or developmental delay.

Measures

Measures in the current study included a newly developed non-literal speech stories (NLSS) task developed for the purpose of this study and the Woodcock–Johnson (Revised) Tests of Cognitive Ability (WJ-R COG).

The NLSS measure was used to assess comprehension of non-literal language. The measure comprised 13 short stories, each of which followed the same format: an introduction that placed the story in context, a sarcastic comment from a character in the story, a metaphor voiced by one of the characters, a simile voiced by one of the characters, and a final comment from one of the characters. In seven of the 13 stories the final comment was a literal comment in keeping with the overall gist of the story. These comments probed participants' general comprehension of the stories. In the remaining eight stories the final comment was another example of language that could not be interpreted literally. These comments were included only to mask the literal probes, and participants' responses were, therefore, not analysed in the present study. The 13 short stories are provided in appendix A. Scoring criteria are given in appendix B.

Overall IQ and MA were measured using the WJ-R COG (Woodcock and Johnson 1989, 1990). For participants over the age of 4 (all participants with WS and 50 of the 52 control participants), the Broad Cognitive Ability—Standard Scale was administered. This composite measure includes seven subtests, assessing expressive vocabulary, verbal working memory, perceptual integration and inferential reasoning, as well as learning ability, auditory processing and processing speed. For the two control participants under the age of 4, the Broad Cognitive Ability—Early Development Scale was administered. This cluster is identical to the Standard Scale except that it does not include tests of processing speed and inferential reasoning ability, which are not appropriate for this age group. Both batteries produce an overall measure of MA, which are highly correlated in the normative sample for the WJ-R COG ($\alpha > 0.90$) and are not differentiated for the purposes of this study (Woodcock and Mather 1989, 1990). Median internal consistency is 0.945 for the Standard Scale and 0.933 for the Early Development Scale, indicative of excellent reliability.

Four cognitive abilities from the core battery were specifically targeted as they were hypothesized to relate to non-literal language comprehension in the present study: (1) expressive vocabulary, (2) verbal working memory, (3) perceptual integration and (4) inferential reasoning. Four subtests were selected from the WJ-R COG to assess these abilities: (1) Picture vocabulary (recognition and naming of familiar and unfamiliar pictured objects), (2) Memory for sentences (memory and repetition of single words, phrases and sentences presented orally, (3) Visual Closure (identification of a drawing that is altered, for example with lines missing or a superimposed pattern), and (4) Analysis–Synthesis

(solving the missing components of an incomplete logic puzzle, with instructions and feedback). Internal consistency reliability coefficients for these four subtests are 0.86, 0.90, 0.69 and 0.90, respectively (Woodcock and Mather 1989, 1990).

Design and procedure

The stories in the NLSS were presented orally by the experimenter. The experimenter was careful to avoid prosodic and non-verbal cues to indicate whether a non-literal meaning was intended. Participants were administered the stories in a pseudo-random order.

Immediately after each comment from a story character, the participant was asked what the character meant by their comment. Participants were awarded a score of 1 if they demonstrated correct understanding of the non-literal meaning of the comment; otherwise, they were awarded a score of 0. Several types of responses were awarded a score of 0, including: literal explanation; ambiguous explanation; irrelevant explanation; no explanation; recognition of non-literal language without interpretation (e.g. he doesn't mean it); and supply of another non-literal comment without interpretation.

Two raters coded responses to the NLSS. Inter-rater reliability based on 50% of the data collected in the course of this study ranged from 93.0% to 95.8% for all four scales of the NLSS for typically developing participants, and from 81.0% to 84.1% for participants with WS. Internal consistency reliability coefficients for typically developing participants ranged from 0.761 to 0.872, and from 0.320 to 0.776 for participants with WS.

The two scorers, both psychology postgraduate students, discussed all points of discrepancy with a third, blinded rater and reached consensus on all items. Composite measures for comprehension of sarcasm, metaphor and simile were created by averaging participants' scores across the 13 stories. A composite measure for literal comprehension was created by averaging participants' scores across the seven stories which finished with a literal comment.

Standardized administration and scoring was adhered to for the WJ-R COG subtests. Responses to the WJ-R COG were converted to age-equivalents and W-scores using the computerized scoring programme for the battery.

Overall MA was under 4 years for two of the participants with WS and the two control participants matched on MA. The test of inferential reasoning (WJ-R COG Test 7: Analysis–Synthesis) was not appropriate to administer to these four participants. Accordingly, inferential reasoning was estimated to be equivalent to overall cognitive ability, as assessed by the Early Development Scale. For all other participants, inferential reasoning was assessed directly.

Results

Paired participants were well matched. Figure 1 shows the chronological age of the participants with WS and the paired, typically developing controls, individually matched for chronological age. Figure 2 shows the mental age of the participants with WS and the paired, typically developing controls, individually matched for mental age.

Table 1 statistically compares the general cognitive abilities of WS, TDCA and TDMA groups, as assessed by the WJ-R COG, in terms of both age-equivalence (AE) scores and *W*-scores.[1] As shown in table 1, paired

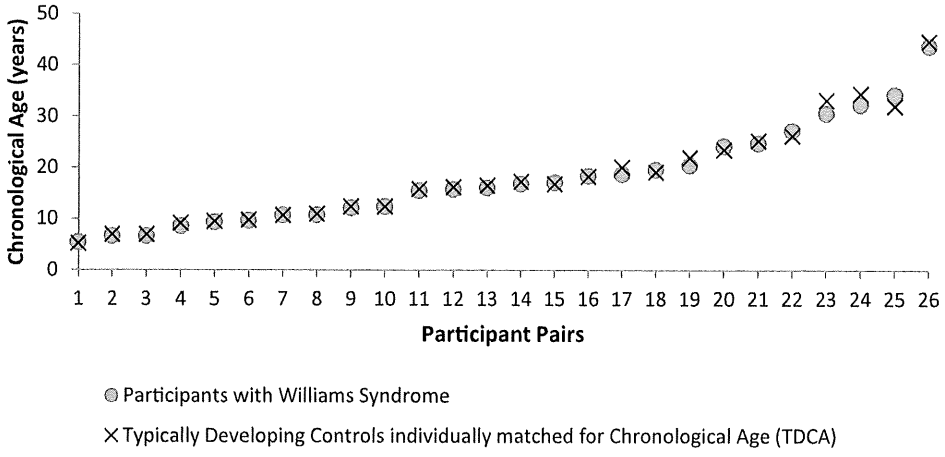

Figure 1. Chronological age of participants with WS and paired TDCA control participants. The degree of overlap of data points indicates how well participant pairs were matched in terms of chronological age. For example, the participants in pair 7 were both 10:8 years, so the data points overlap exactly. However, in pair 23 the participant with WS was 30:5 years, whereas the paired typically developing participant was 33:2 years, so the data points do not overlap exactly.

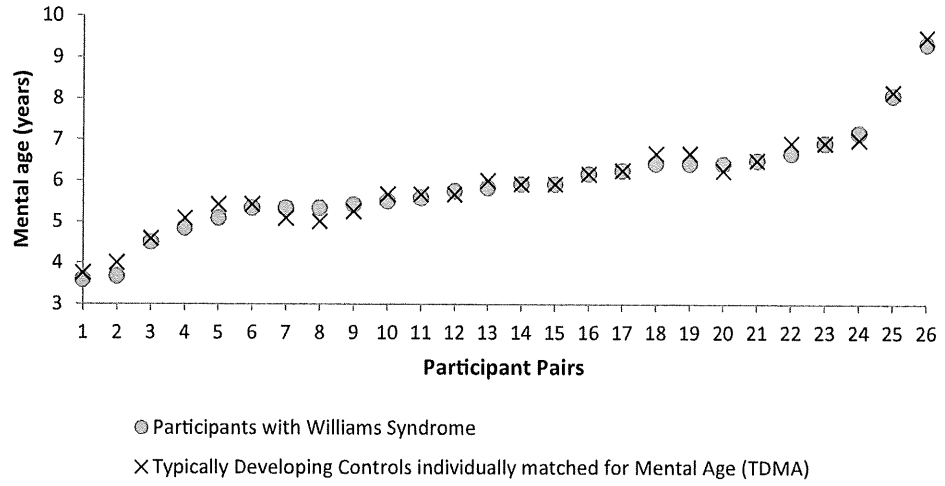

Figure 2. Mental age of participants with WS and paired TDMA control participants. The degree of overlap of data points indicates how well participant pairs were matched in terms of chronological age. For example, the participants in pair 14 both had a mental age of 5:11 years, so the data points overlap exactly. However, in pair 2 the participant with WS had a mental age of 3:8 years, whereas the paired typically developing participant had a mental age of 4:0 years, so the data points do not overlap exactly.

participants were well matched: there was no significant difference in chronological age between WS and TDCA participants, and no significant difference in mental age between WS and TDMA participants. Not surprisingly, given that WS is associated with intellectual disability, IQ was significantly lower in participants with WS than in both sets of matched controls. In terms of individual cognitive abilities, expressive vocabulary, verbal working memory, perceptual integration and inferential reasoning ability were all significantly lower in participants with WS than in TDCA pairs. Verbal working memory and inferential reasoning were also significantly

Table 1. Ages and General Cognitive Abilities of the WS, TDCA and TDMA Groups

	Age-equivalence scores		*W*-score	
	Mean (SD)	Range	Mean (SD)	Range
Williams syndrome (WS)				
Chronological age	18:0 (9:7)	5:4–43:8		
IQ	46.9 (18.1)	18–84		
Overall cognitive ability	5:11 (1:3)	3:7–8:8	472.0 (11.8)	434–493
Expressive vocabulary	6:10 (1:7)	3:3–10:4	466.6 (58.6)	186–501
Verbal working memory	5:0 (1:2)	2:9–8:3	467.2 (12.8)	428–492
Perceptual integration	6:1 (1:9)	3:5–10:10	478.4 (11.0)	456–501
Inferential reasoning	6:0 (1:2)	3:7–8:8	467.3 (14.2)	440–494
CA-matched controls (TDCA)				
Chronological age	18:3 (9:9)	5:2–44:7		
IQ	102.2** (12.4)	78–128		
Overall cognitive ability	17:1 (8:11)	5:5–32:0	508.4** (14.7)	470–532
Expressive vocabulary	17:3 (8:9)	5:7–40:0	519.5** (21.9)	469–563
Verbal working memory	18:3 (9:8)	5:4–29:0	512.3** (21.1)	474–560
Perceptual integration	14:5 (7:9)	6:0–29:0	503.8** (11.3)	480–523
Inferential reasoning	17:8 (9:10)	6:10–32:0	509.0** (16.1)	479–540
MA-matched controls (TDMA)				
Chronological age	5:9** (1:1)	3:8–9:0		
IQ	103.0** (7.9)	85–116		
Overall cognitive ability	6:0 (1:2)	3:9–9:6	474.3 (8.6)	460–497
Expressive vocabulary	6:9 (1:2)	3:9–9:7	477.9 (10.8)	451–497
Verbal working memory	6:4 (2:9)	3:8–16:3	475.3* (15.3)	450–513
Perceptual integration	5:8 (1:3)	3:5–9:0	476.2 (9.1)	456–494
Inferential reasoning	6:9 (1:9)	3:9–11:10	475.7** (16.5)	440–505

Note: Paired *t*-tests were performed comparing chronological age, IQ and *W*-scores in WS and typically developing controls. $*p < 0.05$; and $**p < 0.01$.

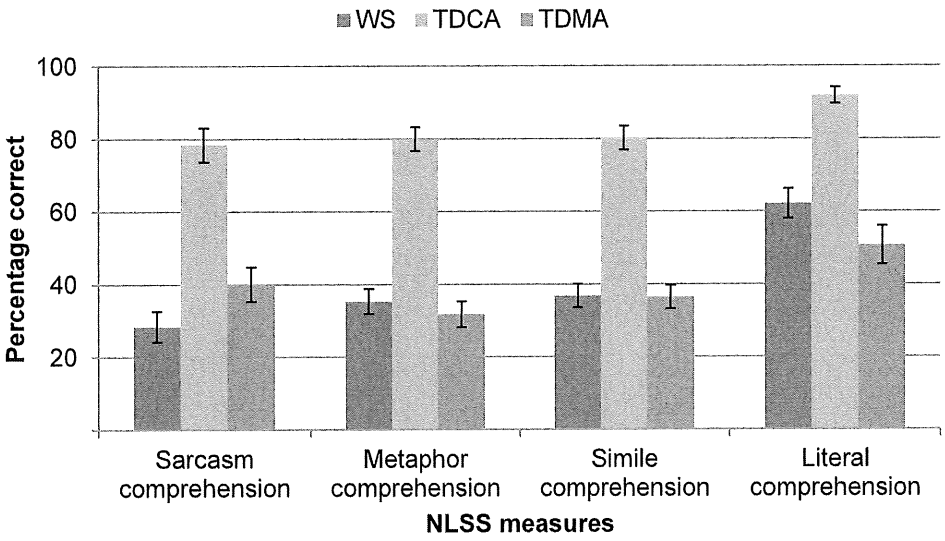

Figure 3. Non-literal language comprehension of WS and controls. Error bars represent the standard error of measurement.

lower in participants with WS than in TDMA pairs. The discrepancy in verbal working memory and inferential reasoning (despite equivalent overall MA) in WS and TDMA pairs most likely reflects the characteristic uneven cognitive profile common in individuals with WS (Bellugi *et al.* 2000). There was no significant difference between WS and TDMA pairs in terms of expressive vocabulary or perceptual integration.

Comparison of non-literal language comprehension in WS and typically developing controls

Figure 3 shows the average non-literal language comprehension of participants with WS and the paired TDMA and TDCA groups. Paired *t*-tests revealed that all NLSS measures were significantly poorer in the WS group than in the TDCA group ($p < 0.001$ for all comparisons). When controlling for overall cognitive ability and literal comprehension (two variables encompassing the main advantages of the TDCA group over the WS group) there remained a significant, albeit lessened, difference in simile comprehension ($p = 0.001$). However, there was no longer a significant difference between WS and TDCA groups in terms of either sarcasm comprehension ($p = 0.954$) or metaphor comprehension ($p = 0.070$). That is, the more advanced cognitive abilities and literal comprehension abilities in the TDCA group seemed to account for their superior comprehension of sarcasm and metaphor relative to WS pairs.

There was no significant difference between participants with WS and paired TDMA participants on any of the non-literal measures, including sarcasm comprehension ($p = 0.121$), metaphor comprehension ($p = 0.308$), simile comprehension ($p = 0.892$) or literal comprehension ($p = 0.096$).

Relationship between non-literal language comprehension and general cognitive abilities

For TDCA and TDMA controls combined, each of the cognitive measures assessed using the WJ-R COG (including expressive vocabulary, verbal working memory, perceptual integration, inferential reasoning and overall cognitive ability) was significantly and positively correlated with each of the measures of non-literal language comprehension ($r \geq 0.57$, $p < 0.001$).[2] However, the significant relationships were not always observed for participants with WS.

Sarcasm comprehension in WS was not significantly correlated with any of the assessed cognitive abilities.

Metaphor comprehension in WS was significantly correlated with verbal working memory ($r = 0.388$, $p = 0.50$), perceptual integration ($r = 0.478$, $p = 0.014$), inferential reasoning ability ($r = 0.590$, $p = 0.002$), and overall cognitive ability ($r = 0.389$, $p = 0.50$), but not expressive vocabulary ($r = -0.032$, $p = 0.878$). In a model with TDCA and TDMA controls combined, there was no significant interaction of group and verbal working memory ($F(1, 74) = 0.873$, $p = 0.353$) or group and inferential reasoning ability ($F(1, 74) = 1.499$, $p = 0.225$), indicating that WS and controls showed similar gains in metaphor comprehension with increasing verbal working memory and inferential reasoning ability. However, the interactions between group and perceptual integration ($F(1, 74) = 7.184$, $p = 0.009$) and between group and overall cognitive ability ($F(1, 74) = 6.824$, $p = 0.011$) were both

significant, indicating that relative to controls, participants with WS showed shallower gains in metaphor comprehension with increasing perceptual integration and increasing overall cognitive ability.

Simile comprehension was significantly correlated with verbal working memory ($r = 0.403$, $p = 0.041$) and inferential reasoning ability in WS ($r = 0.552$, $p = 0.003$), but not expressive vocabulary ($r = -0.136$, $p = 0.506$), perceptual integration ($r = 0.356$, $p = 0.074$) or overall cognitive ability ($r = 0.299$, $p = 0.137$). In a model with TDCA and TDMA controls combined there was no significant interaction of group and verbal working memory ($F(1, 74) = 0.450$, $p = 0.504$) or group and inferential reasoning ability ($F(1, 74) = 1.755$, $p = 0.189$), indicating that WS and controls showed similar gains in simile comprehension with increasing verbal working memory and inferential reasoning ability.

Discussion

The aims of the present study were, firstly, to compare the comprehension of sarcasm, metaphor and simile in WS relative to both TDCA and TDMA control groups and, secondly, to examine the relationship between non-literal language comprehension measures of general cognitive ability in WS and in typically developing controls. In brief, findings showed that participants with WS, as predicted, performed significantly below the level of TDCA controls on all measures of non-literal language and were more on par with TDMA controls. In relation to our second aim, for typically developing controls, each of the cognitive measures was strongly correlated with each of the measures of non-literal language comprehension. The same relationships were not always found for participants with WS. Findings are discussed in more detail below.

Comparison of non-literal language comprehension in WS and typically developing controls

As mentioned above and in line with our predictions, participants with WS performed significantly below the level of TDCA controls on all measures of non-literal language. When controlling for differences in overall cognitive ability and general comprehension on the stories task, simile comprehension remained significantly different between pairs. However, there was no longer a significant difference between WS and TDCA participants in terms of either sarcasm or metaphor comprehension. This suggests that participants with WS had more difficulty interpreting sarcasm and metaphor than their CA-matched pairs because they had lower overall cognitive ability and literal comprehension skills. That is, while the cognitive system for interpreting sarcasm and metaphor in WS may be impaired, these findings suggest that comprehension of metaphor and sarcasm may be beyond the cognitive capacity of individuals with WS given their reduced mental age. This is consistent with evidence that the ability to comprehend sarcasm and metaphor in typically developing children develops throughout middle childhood and is still improving at age twelve or thirteen, a level above the typical mental age of most people with WS (Demorest *et al.* 1984).

The finding that the difference in simile comprehension between WS and TDCA was *not* accounted for by differences in cognitive abilities means that the cognitive system for interpreting simile may well be impaired in WS. The difficulty individuals with WS have in comprehending similes is above and beyond the difficulty expected given their overall cognitive abilities and general comprehension.

With regard to the comparison between WS and TDMA, we found no significant difference between groups on any measure of non-literal language comprehension, even when controlling for differences in chronological age, verbal working memory or inferential reasoning (abilities which, despite matching on overall mental ability, were discrepant between the groups). This departs from our hypothesis that non-literal language comprehension in WS would be below MA-expected levels, particularly metaphor and sarcasm comprehension. Our findings are in keeping with previous research on WS showing that metonym comprehension (Annaz *et al.* 2009) and functional simile comprehension (Thomas *et al.* 2010) were not significantly different to TDMA-matched controls, but at odds with previous research showing that metaphor comprehension (Annaz *et al.* 2009), perceptual simile comprehension (Thomas *et al.* 2010) and idiom comprehension (Lacroix *et al.* 2010) were below TDMA-expected levels.

The discrepant findings may in part reflect differences in the non-literal language comprehension tasks used. Both Thomas *et al.* (2010) and Lacroix *et al.* (2010) used a multiple choice response format. If, for example, typically developing controls were less easily distracted by the incorrect alternatives than individuals with WS (Tomc *et al.* 1990), the multiple choice format of previous studies may have boosted the non-literal comprehension performance of the TDMA groups above the level of the participants with WS.

Relationship between non-literal language comprehension and general cognitive abilities

Whereas non-literal language comprehension was strongly correlated with a wide range of general cognitive abilities in controls, the same was not always true of participants with WS. In particular, sarcasm comprehension was not significantly correlated with any assessed

cognitive ability in our WS group, and expressive vocabulary was not significantly correlated with any measures of non-literal language comprehension. These findings suggest that perhaps the linguistic and cognitive systems that underpin non-literal language comprehension in typically developing individuals interact and integrate in different ways in WS.

Particularly striking was the finding that sarcasm comprehension was not significantly correlated with any assessed cognitive abilities in WS. No previous study has explicitly looked at the relationship between cognitive abilities and sarcasm comprehension in WS. Although the present findings warrant further investigation, one possible explanation for the absence of significant correlations between sarcasm and cognitive abilities in WS is that sarcasm comprehension was at floor and well above the cognitive capabilities of individuals with WS (as mentioned above).

There is a second possibility, however, that warrants further investigation. Hypersociability in WS has been well documented (Bellugi *et al.* 1999, Jones *et al.* 2000). Individuals with WS are often described as friendly and outgoing, with a bias towards faces, especially happy ones (Dodd and Porter 2010). In line with this bias towards happy faces and in conjunction with their eagerness to please and sociable personalities, perhaps some individuals with WS are more biased toward 'happy' interpretations of sarcastic comments than typically developing controls. This bias is likely to differentially affect comprehension of sarcastic comments for which the literal interpretation is often nicer and happier. For example, in the daydreaming story of the NLSS, a teacher says 'It's lovely to see you paying attention.' The literal interpretation is that the teacher is pleased with the student and is complimenting him, and is friendlier than the intended sarcastic rebuke. (In contrast, the literal interpretation of metaphor and similes is often nonsensical. The student's response that he 'was on another planet' is nonsensical if interpreted literally.) In the current study, this hypothetical bias may have mediated the relationship between sarcasm comprehension and the cognitive abilities that were identified as significant predictors for typically developing controls, in part explaining why there were no significant bivariate correlations of the cognitive measures in the current study with sarcasm comprehension in WS. Perhaps this phenomenon also explains why sarcasm comprehension was particularly poor for our WS sample relative to TDMA controls.

A third possibility for the lack of significant associations between cognitive abilities and sarcasm comprehension is WS is that sarcasm is more demanding on higher order executive abilities, such as suppression (Gernsbacher and Robertson 1999), cognitive flexibility and integration of context (Levorato and Cacciari 1995), than either metaphor or simile comprehension. Relative to metaphors and similes, sarcastic comments tend to have the most feasible literal interpretation which the listener must reject and then switch to a completely opposite interpretation, and are most heavily dependent on context for correct interpretation. Participants with WS had significantly poorer inferential reasoning abilities than both TDCA and TDMA pairs. It may be that individuals with WS fell below some critical threshold of executive abilities needed to accurately comprehend sarcasm. The threshold may not be as high for metaphor and simile comprehension, which may be less demanding in terms of executive functioning.

Another unexpected finding in the present research was that vocabulary was not significantly correlated with any measure of non-literal language comprehension in WS. This is in contrast to previous findings which suggested that vocabulary abilities in WS were associated with metaphor comprehension (Annaz *et al.* 2009) and comprehension of perceptual and functional similes (Thomas *et al.* 2010). One reason for the difference in findings may be that both of these previous studies used receptive measures of vocabulary, whereas the current study used an expressive measure. The rationale for using an expressive rather than a receptive measure of vocabulary in the current study was that expressive vocabulary tends to be at MA levels in WS whereas receptive vocabulary tends to be a strength (Brock 2007), and reliance on a receptive measure of vocabulary may overestimate the language abilities of individuals with WS relative to typically developing controls. However, given our findings are in contrast to the work of Annaz *et al.* (2009) and Thomas *et al.* (2010), it may be that receptive but not expressive vocabulary is predictive of non-literal language comprehension in WS.

Another possibility is that the measures used to assess non-literal language comprehension in the various studies differed in terms of difficulty, and that verbal ability predicts comprehension of easier examples of non-literal language but not more difficult examples. For example, Annaz *et al.* (2009) and Lacroix *et al.* (2010) reported a significant relationship between verbal ability and non-literal language comprehension as assessed by one-part, illustrated, story-based measures. In contrast, Sullivan *et al.* (2003) did not find verbal ability to be predictive of non-literal language as assessed by unillustrated stories with multiple probes. Similarly, our study used unillustrated stories with multiple probes. Our findings, therefore, are in keeping with previous research using similar measures of non-literal language comprehension.

Practical implications

The current study suggests that individuals with WS are likely to understand non-literal language at a level in keeping with their mental age and not their

chronological age. It is important to bear this in mind when interacting with individuals with WS. While the use of non-literal language may enrich and enhance interactions with typically developing individuals, it may instead confuse individuals with WS or send a different message to the one intended.

It is particularly important to be aware when using non-literal language with people with WS, as recent research suggests that most children with WS are not likely to monitor if they have understood what they have heard, and even if they are aware of a misunderstanding they tend not to ask for clarification (e.g. Glenwright and Pexman 2010).

Strengths and limitations of the current research

The current study entails a unique contribution to the literature. The newly developed NLSS is a reliable measure of sarcasm, metaphor and simile comprehension that is sensitive to variations in ability both within groups and between groups. There is new evidence to suggest that non-literal language comprehension in WS is below TDCA levels but in keeping with TDMA levels.

A particular strength of the current study is that participants were individually matched to one typically developing control participant of the same sex and chronological age (TDCA pairs), and to one typically developing control participant of the same sex and overall mental age as assessed by the WJ-R COG (TDMA pairs). Matching groups by individual participants may be more sensitive to differences in ability than matching by group means (Shaked and Yirmiya 2004). Matching at the level of the group introduces the risk of spurious differences in non-literal language comprehension when the distribution of ages or abilities differs between groups (Thomas *et al.* 2009).

Despite these strengths, the findings of the current research must be qualified by a number of limitations in the study design. Most importantly, the NLSS has not yet been extensively piloted on either controls or individuals with WS, so the current findings are necessarily preliminary. The NLSS needs further assessment, particularly of its psychometric properties. Possible limitations in the structure and administration of the NLSS became apparent during its use. For example, each of the stories of the NLSS followed the same format: (1) introductory context, (2) sarcasm, (3) metaphor, (4) simile and (5) final comment. As the story unfolded, participants may have been able to use the additional information to arrive at the correct non-literal interpretation. While the NLSS was carefully designed so that no additional contextual information was provided after the introductory section, it is possible that the mere inclusion of further (non-literal) comments cued participants to the context of the story, making later comments in the stories easier to understand than earlier comments. It may have been better to vary the format of the stories so that sarcasm, which was particularly poorly understood in WS, did not always come first. Also, while the experimenter was careful when administering the stories to avoid prosodic and non-verbal cues to indicate whether a non-literal meaning was intended, it is possible that administration was not entirely standardized across participants. Presentation of stories via audiorecordings in randomized order would ensure standardized administration across participants.

Another limitation of the current study is that while participants with WS and TDMA pairs were matched on overall mental age, there were significant differences between participants with WS and MA-matched pairs on verbal working memory and inferential reasoning. Although these differences were statistically controlled in analyses comparing the pairs, confidence in the findings would have been improved had there been no difference between participants with WS and MA-matched pairs in terms of any of the assessed cognitive abilities.

Confidence in the findings would have been further improved with a larger sample size, although the rarity of WS means that larger sample sizes are often difficult to obtain. Certainly, the sample in the current study ($n = 26$) was larger than any of the other five studies that have previously examined non-literal language comprehension in WS ($n = 10$–24).

Directions for future research

Based on the above, future studies are required to investigate whether individuals with WS are biased towards the nicer, happier interpretation of ambiguous language. For example, a study could explore whether there is a systematic and reliable difference in the ability of people with WS to understand sarcasm when the nicer, happier interpretation is the incorrect, literal interpretation (e.g. commenting to a boy daydreaming in class that 'it's lovely to see you paying attention') and when the nicer, happier interpretation is the correct, non-literal interpretation (e.g. commenting to a girl beautifully dressed on her wedding day that she looks 'hideous, just awful!'). There is also a call for studies to determine whether sarcasm comprehension is more demanding on higher order executive abilities than either metaphor or simile comprehension both in typically developing controls and in WS. The contribution of additional cognitive abilities to non-literal language comprehension needs to be further examined, perhaps starting with attentional control and cognitive flexibility.

The feasibility and success of interventions to improve non-literal language comprehension in WS is another area in need of future research. Findings from the current study further suggest that individuals with WS

may need multiple exposures to a specific example of non-literal language, or explicit training in its meaning, before they are able to understand it, or use it appropriately, in conversation. Numerous resources have been developed to help typically developing controls and clinical groups other than WS practice and improve comprehension of non-literal language (e.g. Lazar 2003, Stuart-Hamilton 2004). Whether these resources, either alone or in conjunction with active skills training, benefit people with WS remains to be examined empirically.

In many ways, our understanding of non-literal language comprehension in WS is still its infancy. Future studies in this relatively new and exciting area of research will help further delineate the relationship between cognition and pragmatics (Jaffe 2009).

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Notes

1. The most significant characteristic of the *W*-scale of the WJ-R is that it is an interval scale: any given difference between two points on the scale has the same probability interpretation at any level of the test. For example, if one participant in an age-matched pair had a 50% level of success while the paired participant had a 75% level of success, the discrepancy in *W*-scores between pairs would be 10 points, regardless of whether the paired participants were 4 or 15 years old. In contrast, AE scores reflect participants' performance in terms of the age level in the normative sample at which the average score is the same as the participants' score. Age-equivalent scores are measured on an ordinal scale, not an interval scale, so they are less suitable for many statistical comparisons (Mervis and Klein-Tasman 2004). Accordingly, participants' interval *W*-scores are presented in table 1 and were used for all statistical analyses. *W*-score is the foundational metric for all derived scores available for the WJ-R COG. For any raw score a person might obtain, there is an associated *W*-score that represents his or her ability level in the task on an equal-interval scale. Differences in *W*-scores represent actual differences in ability on the trait measured. A 10-point difference in *W*-scores between participants means that the difficulty level that the lower scoring participant could perform with 50% success, the higher scoring participant can perform with 75% success (Jaffe 2009). This is true at any level of the test. For example, suppose a WS participant has a *W*-score of 470 for Test 7: Analysis–Synthesis (assessing inferential reasoning) and a TDMA control has a score of 480. That means that if the WS participant were given a set of equally difficult inferential reasoning items which he or she could correctly answer 50% of the time, the TDMA participant could be expected to get 75% of the same items correct. The *W*-scale for each test is centred on a value of 500, which is set to approximate the average performance of a typical child aged 10 years 0 months. The typical range of *W* abilities within a test is about 430–550 (Jaffe 2009).
2. Correlation coefficients and significance values for the relationship between cognitive abilities and non-literal comprehension in typically developing controls are available from the first author upon request.

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Appendix A. Non-literal speech stories (NLSS)

Introduction	Sarcasm question	Metaphor question	Simile question	Literal probe
George was daydreaming in class. His teacher asked him a question and he did not respond	The teacher walks up to George and says, 'George, it's lovely to see you paying attention.' *What does the teacher mean by this?*	George replies, 'I was on another planet.' *What does George mean by this?*	The teacher says to George, 'It's like you're wearing ear plugs.' *What does the teacher mean by this?*	George says, 'Sorry, I was not being a good student. I was daydreaming.' *What does George mean by this?*
Ken is a very experienced motor mechanic. When he comes home from work his son gives him a toy truck to fix. All that has to be done is tighten a loose screw. Ken takes the truck from his son	He smiles at his wife who has been watching and says, 'Well, this is quite hard.' *What does Ken mean by this?*	While fixing the truck he says, 'Well, this is a piece of cake.' *What does Ken mean by this?*	His wife walks in and asks how it is going. Ken says, 'This is as easy as pie.' *What does Ken mean by this?*	His wife says, 'Well, this looks like a simple problem.' *What does the wife mean by this?*
Colin has just started university. His father is getting quite annoyed about how little work Colin does. Colin rarely goes to lectures. He is always out at parties. It is 11a.m. on Monday morning and Colin has just gotten out of bed	Colin's brother says, 'Dear me, what a busy life you have.' *What does the brother mean by this?*	Colin's mum comes in. She has been hanging the washing on the line. She sees Colin still in his pyjamas and says, 'Dear me, you don't have much on your plate.' *What does the mum mean by this?*	Colin looks up and the mum says, 'You look like you're on school holidays.' *What does the mum mean by this?*	Colin's brother is about to leave. He says goodbye. As he leaves he says to Colin, 'Dear me, what an easy life you have.' *What does the brother mean by this?*
A father is playing with his little one-year-old daughter. She is very tiny for her age. To make her laugh, he lifts her high up over his head and twirls her around	He laughs and says, 'What a heavy-weight!' *What does the father mean by this?*	He twirls her around again and says, 'You're a feather.' *What does the father mean by this?*	She is twirling and twirling and the father says, 'You're like a balloon.' *What does the father mean by this?*	He puts his daughter down and says, 'What a light-weight!' *What does the father mean by this?*
Mrs Roberts had been working on her feet all day. She walked so much that her shoes gave her blisters. She finally got home. The first thing she did was take off her uncomfortable shoes and put on her slippers	'Ah' she says, 'these slippers are so uncomfortable.' *What does Mrs Roberts mean by this?*	Mr Roberts gets home just after Mrs Roberts. He says hello and asks how she is. Mrs Roberts says, 'I'm fine now that I have pillows on my feet.' *What does Mrs Roberts mean by this?*	Mr Roberts smiles at his wife. Mrs Roberts talks about how she was running around all day on the hard hospital floor. She says, 'Oh, but now I feel like I'm walking on cotton wool.' *What does Mrs Roberts mean by this?*	Her husband asks, 'Why's that?' Mrs Roberts says, 'Now I'm wearing uggies.' *What does Mrs Roberts mean by this?*

Continued

Appendix A. Continued

Introduction	Sarcasm question	Metaphor question	Simile question	Literal probe
It is Greg's birthday. He will be five. His grandmother is coming over to give him a gift. Greg hopes that it will be a toy truck. When his grandmother arrives, Greg opens the present. It is a jumper, not a toy truck! Greg throws the jumper on the floor and runs out of the room	Greg's grandmother says to Greg's mother, 'Well, he likes it a lot, doesn't he?' *What does the grandmother mean by this?*	After Greg ran out, his mum says, 'Well, he got out of the wrong side of the bed.' *What does the mum mean by this?*	Greg's older sister Jane is also in the room. She says, 'He's like a sour puss.' *What does Jane mean by this?*	Grandmother, mum and Jane all look at each other. Greg has still not come back. Grandmother says, 'Well, he doesn't like it very much, does he?' *What does the grandmother mean by this?*
Jim and Bill have gone to watch their favourite band play. Unfortunately they were not able to get in. The tickets were all sold out. However, they might still be able to see something through a window. Jim climbs up onto Bill's shoulders to try to reach the window. But Jim is huge. Poor Bill nearly collapses under Jim's weight	Bill says, 'What a light-weight!' *What does Bill mean by this?*	After a minute, Bill is still holding Jim up. Bill says, 'You're a lump of lead.' *What does Bill mean by this?*	Bill finally puts Jim down. Bill looks at Jim and says, 'You're like a tonne of bricks.' *What does Bill mean by this?*	Bill then says, 'What a heavy-weight!' *What does Bill mean by this?*
Melissa is babysitting John. John draws all over her walls in texta	Melissa says to John, 'I really like looking after you.' *What does Melissa mean by this?*	Melissa asks John to give her the textas and John shouts out, 'No!' Melissa says, 'You're a little monster.' *What does Melissa mean by this?*	John's mum finally comes to pick him up. Mum asks Melissa if John behaved. Melissa says, 'He behaved like a little devil.' *What does Melissa mean by this?*	n.a.
It was a very hot day. The school children were trying to work, but there was no breeze flowing through their classroom	Liam said to his teacher, 'It's freezing today Miss.' *What does Liam mean by this?*	The teacher says she knows it is hard to work and tells everyone to come and sit on the floor. She is going to read a story. Anne says, 'I'm melting.' *What does Anne mean by this?*	After a while the teacher looks down to find that half of the class have fallen asleep. The principal comes to the door to let the children know that they can go home. The principal says, 'This classroom is like an oven.' *What does the principal mean by this?*	n.a.
Kirk's mum walks into Kirk's room to tell him something. She sees that there are clothes and toys everywhere	She says, 'It's good to see that your room is nice and tidy Kirk.' *What does Kirk's mum mean by this?*	Then Kirk's dad comes in to see what is going on. He says, 'Gosh, a cyclone has been through your room.' *What does Kirk's dad mean by this?*	Kirk can't disagree with his parents and so he says, 'Yep, my room is like a pig sty.' *What does Kirk mean by this?*	n.a.
Nick's parents are having a dinner party. All the guests had arrived when Nick finally came out to meet them. He is wearing a t-shirt with holes in it and his jeans are torn	Nick's mum says, 'You look lovely darling.' *What does nick's mum mean by this?*	A guest walks up to Nick's mum and asks, 'Is this your son Nick.' Nick's mum says, 'This is my little orphan boy.' *What does nick's mum mean by this?*	Nick's dad overhears and laughs. He says, 'I guess it looks like we're too poor to buy him clothes.' *What does Nick's dad mean by this?*	n.a.
Robyn has spent hours cooking a new recipe for the family dinner. She hopes everyone will appreciate the trouble that she has gone to. However, Robyn's son Thomas takes a very small serve and then hardly touches the food on his plate	Robyn says, 'Do leave some for the others.' *What does Robyn mean by this?*	Thomas plays with his food. He doesn't eat any more. His father says, 'You are a sparrow.' *What does his father mean by this?*	Thomas' sister brings her plate to the table. Hers is full of food. She looks at Thomas' plate and says, 'You eat like a bird.' *What does his sister mean by this?*	n.a.
Three friends are watching a football game. Peter and Steve are there because they like football. Their other friend, Cheryl, is there to watch her boyfriend play. Cheryl isn't really following the game. All Cheryl wants to do is watch everything that her boyfriend does	Peter says to Steve, 'It's obvious that she hates him.' *What does Peter mean by this?*	Steve says, 'Her eyes are glued on him.' *What does Steve mean by this?*	Cheryl continues to watch her boyfriend and does not talk to her friends at home. Peter says, 'It's like she is under a spell.' *What does Peter mean by this?*	n.a.

Appendix B: Scoring criteria for the non-literal speech stories (NLSS)

Participants were awarded a score of 1 if they demonstrated a correct understanding of the non-literal meaning of the comment; otherwise, they were awarded a score of 0. Several types of responses were awarded a score of 0, as summarized in table B1.

Table B1. Examples of explanations of the sarcastic comment 'It's lovely to see you paying attention.', in each category

Type of response	Example
Correct responses	
Knowledge of linguistic device	She's being sarcastic
Correct interpretation	He's daydreaming; he should pay attention
Incorrect responses[a]	
Literal explanation	It's good you're paying attention; she's happy with him
Ambiguous explanation	He is; I don't like you paying attention
Echoing	It's lovely to see you paying attention
Other explanations	It's lovely to be good; he's reading a book; he's really thinking
Recognition without explanation	She doesn't mean it; she's joking; she's being silly
Another non-literal comment without explanation	You're off with the fairies
No explanation	I don't know

Note: [a]Participants providing any incorrect response other than a literal interpretation were then asked to choose between a literal interpretation and a non-literal interpretation. If correct choice of the non-literal interpretation in this forced-choice condition was considered equivalent to spontaneously providing a correct non-literal interpretation (i.e. awarded a score of 1), the pattern of reliable and non-reliable results were broadly similar and for the sake of brevity are not reported here.

Demonstrating knowledge of the linguistic convention (e.g. 'she's being sarcastic) was only scored as correct for sarcastic comments, as by definition sarcasm is saying the opposite of what is meant: describing a comment as sarcastic entails understanding of the non-literal meaning. If a participant demonstrated knowledge of the linguistic convention for metaphors or similes (e.g. 'it's a metaphor'), this was awarded a score of 0 because such a response entails understanding only that a linguistic convention was used, not its meaning.

The rationale for scoring the NLSS in this way is that the study was interested not in simply awareness that sometimes people do not mean what they say, but in participants' understanding of what people *do* mean when they use non-literal language. A participant may have learned that the language structure 'as X as a Y' typically signifies a simile without understanding which of the characteristics of Y are intended to apply to X.

The fact that the current study was interested in participants' understanding of the *meaning* rather than simply the *existence* of non-literal language similarly accounts for the decision to score as incorrect those responses which showed recognition of non-literal language without explanation, or provided another non-literal comment without explanation.

Explanations that were literal, ambiguous, echoed, or unrelated were scored as incorrect as the participant did not demonstrate any understanding of non-literal language. Participants were not penalized for confusing gender pronouns (e.g. saying 'he loves her' rather than 'she loves him').

To the Honorable Judge Crabtree.

I am writing to you in order to ask for mercy from you when you pass final judgement upon me for my charge of conspiracy.

I understand the severity of my crime and I also understand that if the explosive device that John T. Booker Jr. used was real and he was able to detonate it many people would have died. If I could take back my part in giving money to John T. Booker Jr. I would and if I could take back ever meeting the guy I would. I am not a Hardliner Jihadi, I am just a human being that made a big mistake. Nobody is perfect, and we all make mistakes at some point in our lives. This was mine. There are no amount of words that I can say that would prove that I'm sorry for my action regarding Ft. Riley. For those it is too late, but I hope and pray that these words don't fall on deaf ears. I keep trying to understand why I did it and I can't think of any answer. All I can say is I am not perfect and have made several mistakes throughout my life and probably will make many more. Everybody has made mistakes because nobody is perfect, not even the so called good guys.

With this being said, I am asking you personally for probation. I can personally say, that I have never wanted any harm or damage done to my country. And would do anything necessary to protect it.

I have a Genetic Disorder called Williams Syndrome disorder, which has affected me my whole life and will continue to till I am dead. Williams Syndrome has both physical and mental problems associated with it, and with my mental problems, it affects my ability to process situations involving decision making, it impairs me which allows others to take advantage of me and lead me down the wrong path in life.

Throughout my life, I have struggled, rather it be me going to the NICU hospital when I was 3 days old or in high School in which I was being bullied by my own classmates for being in Special Ed, because of my Williams Syndrome. Then there is me finding and keeping jobs that I can do. This is a real struggle for me because of the mental capability of my Williams Syndrome, employers don't want to hire a broken minded person.

Should you decide to grant me probation, I would be extremely grateful as I have accepted that this will haunt me everywhere I go, from this point on. But I won't let it hold me back and have already been planning my future should I not go to prison. First - I would be trying to either get a job or start my own business. Second- Getting a place of my own either inside or outside of Topeka. Third- I still hope that I can find a woman to marry that would keep me on the straight and narrow. It is funny how for every good man there is a great woman to keep him in line.

And finally, to wrap this letter up to you, Judge, I would like to say this. If I was a terrorist, I wouldn't have been cooperative with the FBI when they came to my parents house and I sure as heck wouldn't have complied with all my pre-trial probation requirements, as I would have been out committing terrorist acts. But I will say this your Honor. This whole experience has been a tremendous life experience, in which I plan on taking with me wherever I go.

Thank you, your Honor for taking the time to read this and contemplating my letter in your final judgement.

Alexander Blair

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DIAGNOSTIC INTERVIEW REPORT
Alex Blair
[redacted]
USA v. Alexander E. Blair
USDC-Kansas #15-MJ-5040-KGS

INTRODUCTION AND PURPOSE:
On April 13, 2015, Christopher M. Joseph, Esq., contacted Logan & Peterson, PC for a psychiatric evaluation of his client 28-year-old Alex Blair. Mr. Blair was charged as part of a potential plot to "bomb" Fort Riley, Kansas, with John Booker, Jr. (a.k.a Mohammed).

On April 10, 2015, a Special Agent of the FBI filed a single count complaint indicating that between March 17, 2015 and April 10, 2015 Alex Blair had knowledge of the actual commission of a felony, meaning the attempted use of a weapon of mass destruction and concealing material support to a foreign terrorist organization. The complaint indicated that Alex Blair was involved with 20-year-old John T. Booker Jr. (a.k.a. Mohammed Abdallah Hassan) who intended to wage Jihad and die in the process. Citing confidential human sources, a Vehicle Born Improvised Explosive Device (VBIED) was to be constructed and preparation for that included renting a Topeka, Kansas storage unit, which Alex Blair participated in. His participation was to loan $100.00 to Booker for rental of the storage unit. Blair reportedly knew that Booker intended to construct the VBIED and urged him to cease talking openly about his intentions to conduct an attack, for fear of public attention. Mr. Blair was also cited for failing to report an imminent attack.

At the time of this writing, Mr. Blair was likely to plead to a "conspiracy" charge related to the initial complaint.

Mr. Blair lives with Williams syndrome. Williams syndrome is caused by micro-deletion of 16 genes on chromosome 7q11.23. The micro-deletion causes mild to moderate mental retardation or learning disability. The personality of individuals with Williams syndrome involves high sociability, over friendliness, high levels of empathy, and an undercurrent of anxiety related to social situations. While there are strong socialization skills (interpersonal skills related to initiating social interaction) and strength in communication, there are clear weaknesses in daily living skills and motor skills relative to overall level of adaptive behavioral functioning. (Williams syndrome: Cognition Personality and Adaptive Behavior by Mervis and Klein-Tasman in Mental Retardation and Developmental Disabilities Research Reviews 6:148-158; 2000).

Also in Mervis Klein-Tasman, Williams syndrome personality profiles include high gregariousness, strong orientation toward the people, high empathy, high-sensitivity to criticism, and high anxiety. During development, most Williams syndrome children do not evidence stranger anxiety. They are often described as never having met a stranger.

The purpose of the assessment was to evaluate Mr. Blair's participation in the alleged "bombing plot" in view of his Williams syndrome.

Records would be forwarded as they became available. Mr. Blair had an extensive diagnostic and treatment file related to Williams syndrome at Children's Mercy Hospital in Kansas City, Missouri, the Menninger Clinic Children's Hospital, and education documentation related to consequences of his genetic disorder. In addition to the psychological consequences of Williams syndrome, Mr. Blair also experienced life-long physical manifestations of the chromosomal deletion.

DESCRIPTION OF THE EVALUATION:

Mr. Blair was psychiatrically evaluated at Logan & Peterson, PC in Kansas City, Missouri.

Face-to face interviews:

Alex Blair

July 7, 2015: Psychiatric Interview 2.33 hours
July 7, 2015: MMPI-2, PAI, Shipley-2
July 8, 2015: Psychiatric Interview 2.75 hours
Total face-to-face interview time of Alex Blair: 5.08 hours

Family Interviews

July 7, 2015 Interview of Tom Blair: 0.75 hours
July 24, 2015 Interview of Jane Blair: 1.17 hours

Alex understood a detailed forensic warning. His parents understood the lack of confidentiality.

The psychiatric assessment of Alex Blair included detailed record review (medical and law enforcement discovery), background review, Mental Status Examination, psychological testing (Shipley-2, MMPI-2, and PAI), discussion of the events of the charged offense, and collateral interviews (parents). Respectively, the paper-and-pencil objectively scored psychological tests were a rapid IQ test, and two general personality assessments with validity scales and proposed DSM-IV diagnoses.

INDEX OF MATERIAL:

A number of records were reviewed from exhaustive number provided. Highlights of essential records are included.

A. Law Enforcement and Court Documents –

1. April 10, 2015 FBI/Task Force interview of Alex Blair

B. Medical and School Records –

1. Children's Mercy Hospital records (pages #1-#209)
2. April 20, 1995 Menninger Children's Division clinical assessment and treatment file
3. May 10, 2006 Northeast Kansas Education Service Center IEP

C. Forensic Assessments and Miscellaneous –

1. Extensive Social Security Disability file

SELECTED REVIEW OF MATERIAL:

1987

January 7, 1987 Cardiovascular and Thoracic Surgeons (Topeka, Kansas) letter noted that Alex Blair was one month old and was being referred for cardiac evaluation. Symptoms manifested at four days old including a heart murmur. He had tachypnea (respiratory rate of 50 per minute) with subcostal retractions, and no cyanosis. Heart sounds and imaging exams were consistent with moderate perimembranous **VSD** (ventricular septal defect) and compensated congestive heart failure.

At 3 months, 18 months, and 25 months old, Alex's length was normal at around the 50th percentile. However, his **weight** for the same time frame was **less than the 5th %ile** until 25 months old (25th %ile). His **head circumference** at 18 months and 25 months was the **5th %ile**.

August 28, 1987 Children's Mercy Pediatric Cardiology letter noted that Alex was adopted and had a **heart murmur** noted at age 4 days old. Diagnosis was **VSD**.

1990

November 9, 1990 Children's Mercy Pediatric Cardiology Office yearly reevaluation noted that Alex's **strabismus** had been corrected by surgery in July 1990. Alex had good activity levels and tolerance. Cardiological diagnosis remained small VSD and **Williams syndrome**.

1993

August 17, 1993 Orthopedic Associates (Topeka, Kansas) letter to Children's Mercy Cardiology diagnosed **mild juvenile scoliosis**. Alex was six years and eight months old. His VSD was resolving. The scoliosis was from ribs T6 to T12 on the right. He should be watched expectantly, encouraged to swim, encouraged to participate in other athletic activities, to keep himself strong/flexible, and to return in one year.

1994

December 19, 1994 Children's Mercy echocardiography report by the Section Chief of Pediatric Cardiology noted a small perimembranous VSD with a left-to-right shunt including a pressure drop of 56 mmHg across the VSD.

1995

June 27, 1995 consultation by Kenneth Ensroth, M.D. (Menninger Clinic-child psychiatry) diagnosed eight-year-old Alex with **ADHD**, **Learning Disorder** (with possible delay in speech and language), **Williams syndrome** (diagnosed in infancy with consequent multiple physical handicaps), and need for medication treatment to correct ADHD.

Developmentally, Alex may have "picked up" some of his older brother's ADHD symptoms. Alex had a history of eye surgery, mild spinal scoliosis, no history of head injuries, and monitoring for VSD.

1998

December 7, 1998 Children's Mercy Echocardiogram noted a very small perimembranous VSD with left-to-right shunting and mildly depressed left ventricular systolic functioning.

1999

January 15, 1999 Menninger Psychoeducational Consultation noted that 12.1-year-old 5.4 grader Alex Blair was a student at Jefferson West Intermediate School in Meriden, Kansas. Accommodations had been made such as a allowing him to use a laptop. He was beginning puberty. Dr. Ensroth had been following him on a regular basis for medication monitoring. Current medications included Adderall, clonidine, and Prozac.

Most recent comprehensive test data in April 1995, through the School District when Alex was 8.3 years old, indicated **5th percentile** (borderline) **verbal abilities** and 45th percentile (average) performance skills. Overall achievement was at the average to low average range.

Alex demonstrated multiple developmental delays and complex issues related to uneven performance and cognitive functioning. He had a good ability to "rote learned facts" such as about science or nature but making connections, integrating information, and verbal abstraction was quite limited relative to same age peers. He would need significant assistance to link separate bits of information. His developmental difficulties were typical of **Williams syndrome**. This included perseverating on tasks, having difficulty moving from one task to another, performing better if allowed to finish one task before starting another, had a fairly rigid interactional problem-solving style, could become easily frustrated if given two different sets of directions for one thing, and may not flexibly understand directions or questions when worded in a different way even though they had the same content. Managing academic content would likely become more difficult for him. Many recommendations included adapting his curriculum and encouraging structured activities that would allow for social interaction.

June 16, 1999, letter by Marius Hubble Jr., M.D. indicated 12.5-year-old Alex Blair experienced improved exercise level and tolerance since Adderall was discontinued. Clonidine, Prozac, and Ritalin were ongoing medications. He had **Williams syndrome**. A small perimembraneous ventricular septal defect had spontaneously closed. He still had mild left ventricular enlargement with normal systolic functioning. He had scoliosis.

Ritalin replaced Adderall due to possible contribution to decreased ventricular functioning through cardiomyopathy (March 15, 1999).

2006

May 10, 2006 Northeast Kansas Education Service Center IEP noted that 19-year-old 12th grader Alex Blair was enrolled at Jefferson West High School. Alex had experienced language delays, gross/fine motor delays, and attention problems characteristic of Williams syndrome.

Academically, he successfully worked at grade level, but at a slower pace than the majority of his peers. He was easily overwhelmed and often quit trying. He had difficulty with written language. Though he was in 12th grade, he read between the ninth and 10th grade level,

seemingly grasping Science and Social Studies concepts the best. Special Education services were justifiable. He possibly experienced social stigma due to his Special Education status. His educational success would benefit from continued accommodation during math, reading, and writing. An extended school year was not required.

2015

All four of the FBI interviews of Alex Blair were reviewed in their entirety. Mr. Blair appeared quite passive about Mr. Booker, did not demonstrate any extremist Muslim views, and appeared quite naïve about Islam in general. He had been "a Muslim" only a few months, still struggled to learn about it, was still learning basic Islamic concepts, and was still learning very basic Islamic vocabulary. He didn't appear to have any "operational" understanding of ISIS/ISIL.

In addition, Mr. Blair also appeared interpersonally quite naïve, was easily led, was easily guided by law enforcement suggestions of his "helpfulness to them," and showed no guile. He did not appreciate the seriousness of what it meant to be interviewed by the FBI. He viewed himself as only there to help the government stop Mr. Booker.

During a number of Confidential Informant phone calls between Mr. Blair and Mr. Booker, Mr. Booker indicated that Mr. Blair needed to indicate his commitment or their relationship couldn't develop any further and Mr. Booker would be unable to tell him important things. Though the nature of the "commitment" was somewhat vague, it included Mr. Booker asking for help on rent with the storage area. Mr. Blair seemed to freely offer the rent, which was $100.

FINDINGS:

Identifying Information

Alex lived at a house, owned by his parents. He checked in with his pretrial bond officer every month. He worked at the Oskaloosa Country Club.

Alex knew he was charged with "conspiracy for something" but that was not something he paid attention to. In his vernacular, he was "in deep shit with the government who wanted him in prison." He felt overwhelmed with this case. His verbal interactions were somewhat refreshingly candid but blunted and suggestive of cognitive immaturity. He wanted "to go back to his life," and felt violated by the government/FBI who "lied to me, took all I said and used it against me though I was helping them."

Alex was in Western clothes noting that he had worn Muslim garb only on Fridays. Because of this ordeal he'd "stopped all religion," though he still believed in a higher power. He reported a strong affiliation with the Fairlawn Church of the Nazarene, feeling accepted there.

Past Medical History

He was being treated with 20 mg or 40 mg fluoxetine (generic Prozac) per day for "anxiety and depression." He took different doses from day-to-day, citing that his daily dosing "depends on life," seeming to mean his daily difficulties.

He also took over-the-counter ibuprofen for back pain related to scoliosis. He didn't take any natural mental health medications or muscle building powders.

He was being treated by Dr. Ken Smith. Focus on treatment was for medications. Alex was naively preoccupied with ghosts.

He had experienced a significant loss of consciousness when he may have fallen on the stairs at less than 10 years-old. He doesn't recall the circumstances or if he had problems because of that. He always had **difficulty with memory**.

He never had been injured in a motor vehicle accident. He didn't experience any posttraumatic response to life events such as having been shot at, shot, stabbed at, or stabbed.

Several years earlier, he had driven after drinking when distraught. He was distraught after visiting a dead classmate in a cemetery. Also, once in Colorado, the driver fell asleep and there was an accident. Alex was not hurt but he can "describe everyone" and had vivid reliving memories. Last, he was "T-boned" in a car in Topeka when a van ran a red light. He denied any traumatic consequences such as reliving the events, flashbacks, headache, or changed mentation as a consequence of the accidents.

He asserted that his older brother, now more than 30 years-old, held him underwater until he panicked. He denied passing out or loss of consciousness but swallowed some water. He was bullied in **high school** due to being in **Special Education**.

He denied history of self-mutilation, tattoos, or piercings. He denied huffing hydrocarbons to feel "high." He tried the choking game one time when depressed in jail. Otherwise, he had never choked himself or involved choking with any sex act.

He had **eye surgery in childhood**. He needed back surgery due to the **scoliosis**.

He denied high-risk activities such as intravenous drug use, sex with prostitutes, sex with women who were drug users, and any sexual contact with men. He denied any traumatic sexual experiences during childhood including grooming or sexual seduction by adults. He denied exposure to HIV or hepatitis.

He reported one extramarital affair that caused him to feel that he should divorce his wife without "telling her exactly." It was his way to make up "morally" for his lapse in judgment.

Self-Assessment
Alex believed his best qualities included honesty, which "sometimes got him in trouble," being on time for work, being friendly, no problems with anger, and he was caring. He noted that people around him "didn't believe the accusations" by the government.

Areas for self-improvement included improving his anger control, learning how to deal with people, seeing people as nice to him, treating others correctly so they won't be nasty, and that he is "antisocial." By "antisocial," he meant that he didn't want to be around others though he prefers "commonality" such as in church. He has left church services due to feelings of anxiety.

He believed that there was a place in a Colorado "valley," that he could "hold" until the US military arrived. That is, he could "hold it" (meaning, defend it) from "Korean or Mexican illegal invaders." He had no formal plans about that or an organized militaristic mindset.

About anger control problems, he tended to walk away when upset so "something bad" would not happen. This had been his pattern since teen years. He believed "walking away" started after school fights because he became "the bully" after having been bullied so much. Notably, he denied any problems fighting with his wife or difficulties in the workplace due to "bullying." He denied anger at any person or any desire to retaliate.

Drug and alcohol abuse
Alex last smoked marijuana in November 2013. He hadn't smoked any because "ran out and quit." He might stop alcohol again.

Hobbies
He liked hiking, camping, and being in the woods. He also liked to "study by reading."

He enjoyed video games such as *Grand Theft Auto-San Andreas*. He would not go "darker" in the game and shoot innocents. His brother played *Call of Duty* and *World of Warcraft*, but Alex did not. He wasn't really sure which first-person shooter games he liked but after he left Colorado he stopped all "technology."

In the past, he had a .38 caliber pistol and a .38 caliber double-shot derringer but didn't carry them because of his charges.

Religious Life
Alex only had a slight interest in Muslim thinking now. Islam was no longer relevant to him. His family was Catholic but he was the only one to stay close to any church. He currently participated in the Fairlawn Nazarene Church.

In order, he had faith practices at the following congregations:

Seventh-day Adventist on Wanamaker Road	16 years old
Fairlawn Nazarene	high school
Meriden United Methodist Church	"inconsistently" in 2013
Fairlawn Church of the Nazarene	2014 (security team)
Mosque	January-April 2015
Fairlawn Church of the Nazarene	Sunday after he was released from jail; "still welcome there"

Alex found positive aspects to each one of the congregations he participated with. Alex described himself as a "nomad by spirit," due to his ADHD and often not sustaining close relationships with people.

To be a part of the church "security team" began before his involvement in the charged offense. The Topeka churches, in Alex's understanding, utilized "security" after concerns about "active shooters," and longer police response times in Topeka. He had never been involved in any incident. No one in "security" carried weapons. Everyone was welcome at services.

His interest in Islam started after he liked the structure of praying five times per day. He also liked the idea of becoming a "better guy" after he stopped using marijuana and alcohol. He didn't attend NA or AA. During this portion of the assessment he referred to a copy of the Koran in the examiner's office to back up his thinking. It was notable that though he spoke

about Islam in positive ways he could never find the passages that backed up his thinking. He just leafed casually through the pages.

He became interested in Islam "for a while" due to a desire to reduce his "Islamophobia," to see/study Islam on a spiritual level, and to "recognize that not all Muslims are terrorists." At the mosque, there were some young men but mostly older men and it was difficult for him to find someone to relate to. He was never interested in Wahhabi Muslim thinking and didn't even know what that was. He was unaware that any of the 9/11 co-conspirators were interested in Wahhabi thinking. He viewed such extreme thinking as "sects" and cults similar to the KKK and Hitler "to be avoided."

About ISIL or ISIS, he only viewed them as a "combat group," who used a philosophy to eliminate other soldiers. He had seen movies such as The Message about the birth of Islam but did not watch "Jihad John" execution videos. He did not identify with or think much of OBL/UBL in any idealized way except as "quite a character" that was "mad at Saudi Arabia."

Mr. Booker told him about the Flames of War which was about ISIS, but Mr. Blair did not like it and told Booker that. Alex wanted Mr. Booker to understand that it was important to find alternatives to violence, "to build something good," and not focus 90% of the time on fighting.

Mr. Booker had wanted him to swear allegiance to Al Baghdadi (ISIS/ISIL leader), but Alex would not. He then stated to Booker that he would swear allegiance only to Allah. Alex denied any knowledge of, or allegiance to, the "blind Shaikh" Omar Abdel-Rahman. He wasn't interested in Mohammed Atta, Terry Nichols, or Timothy McVeigh. In fact, Alex "looked down on them" and he wasn't angry like they were. He viewed Al Qaeda as "stupid asses."

In addition, Alex had thought about Hinduism but he couldn't relate to it. He studied Buddhism but wasn't interested. Even so, he still saw faith as an important thing in his life. He had strong beliefs in being "good," finding that a particular "denomination" less important.

DISCUSSION OF EVENTS RELATED TO THE LEGAL SITUATION:

Essentially, Mr. Blair did not believe that Mr. Booker would actually attempt to bomb Ft. Riley. He loaned $100 to Mr. Booker, to be helpful, not to intentionally further any terroristic act.

SUMMARY OF PSYCHOLOGICAL TESTING:

Shipley-2 (July 7, 2015)

The Shipley-2 is a rapid IQ instrument with Vocabulary and Abstraction sections that summate to a Composite IQ. A Shipley-2 Composite IQ is similar to other IQ tests in that an average IQ is 100 points plus or minus 15 points (average range: 85-115 IQ points).

Alex Blair scored a Vocabulary score of 98 points (45th percentile) and an Abstraction score of 93 points (32nd percentile). These summated to a standard Composite IQ of 96 points (39th percentile).

Note that the standard error of measurement for each section of the PAI is three or four points, thus his Composite IQ (equivalent to a Full-Scale IQ on other IQ tests) was measured at 96 but the IQ could range between 92 and 100 IQ points. All were still in the average range.

These were within his academic achievements, language ability, interpersonal style, and employment interests.

PAI (July 7, 2015)

The PAI is a general personality assessment with validity scales and proposed DSM-IV diagnoses.

Mr. Blair produced a PAI reflecting a "cry for help" or an extreme or exaggerated negative evaluation of oneself and life. The interpretation was provided only as an indication of his self-description. Notably, there was no overwhelming defensiveness or disqualifying malingering though he expressed considerable social discomfort.

Possible DSM-IV diagnoses are advanced as hypotheses. All available sources of information should be considered prior to establishing final diagnoses.

Possible DSM-IV diagnoses include: paranoid schizophrenia; substance dependence; alcohol abuse; schizoaffective disorder; major depressive disorder; posttraumatic stress disorder; intermittent explosive disorder; undifferentiated somatoform disorder; dysthymic disorder; borderline personally disorder; and, paranoid personality disorder.

Notably, the PAI described no significant problems with antisocial behavior or problems with empathy.

There are 27 PAI critical items that reflect serious pathology and have very low endorsement rates in normal samples. Mr. Blair endorsed 16 of 27 critical items. These were in the topics of delusions and hallucinations, potential for self-harm, potential for aggression, substance abuse, potential malingering, and traumatic stressors.

Mr. Blair endorsed many psychological conditions. Clinical interview, and review of his medical records, indicated that he did not experience difficulties such as schizophrenic spectrum disorder, bipolar disorder, severe anger control problems, and major personality disorder. His endorsement of those items suggestive of those difficulties arose from his difficulty appreciating subtle word concepts of PAI questions. His difficulties with such finer points of language clearly affirm that Alex continues to experience biologically-determined social immaturity, lifelong consequences of learning difficulties, and difficulty interpreting language subtleties as a consequence of Williams syndrome.

MMPI-2 (July 7, 2015)

The MMPI-2 profile should be interpreted with caution as there was some possibility the clinical report indicated an exaggerated picture of his current situation and problems. He presented an unusual number of psychological problems that could result from poor reading, confusion, disorientation, stress, or a need to seek a great deal of attention for his problems. He may have been more careless in the latter portion of the test but that did not invalidate Clinical Scales from the first two thirds of the test.

Symptomatically, Alex Blair presented with a severe psychological disorder, giving the appearance of a florid psychotic process with personality decompensation, social withdrawal, disordered affect, and erratic or assaultive behavior.

> (**NB:** Similar to the contrast between the PAI and clinical information, this was not his presentation on face-to-face interview).

There was chronic maladjustment with a recent intensifying of his problems.

Overall possible diagnosis was paranoid schizophrenia or delusional disorder.

> (**NB:** The apparent erratic personality style with psychotic preoccupation was neither Mr. Blair's face-to-face presentation nor his general presentation in all previous medical records. Thus, the MMPI-2 doesn't reflect some sort of hidden psychosis or hidden tendency to violence, rather Alex Blair's biological inability to pick up subtleties of meanings in written material.)

MENTAL STATUS EXAMINATION:

Alex was neatly and cleanly dressed. His eye contact was adequate. He didn't know the date, but was oriented to the purpose of the assessment. At times, he used stilted or overly intellectualized phrases.

He reported depression and decreased motivation but was trying to move forward. He was unsure what to do with himself or what plans to make since he might go to prison. He couldn't say if he distanced himself from others.

He gained 20 pounds due to an overactive appetite. There was no evidence of smoking or chewing tobacco. He denied any signs or symptoms of eating disorder.

He reported low energy level as a consequence of his arrest. Before arrest, he felt energetic, earned adequate money, felt productive in his life, and didn't worry who his friends were.

His sleep had been variable with the occasional beer to take the edge off the day. He only felt rested one or two days of seven since release from jail in April 2015. He denied bad dreams, nightmares, or reliving/recollection of traumatic events.

He viewed his future as very bleak. He bemoaned that he often mixed up words such as difference between "condone" and "condemn." When there are word mix-ups like that he usually just keeps talking until the context is understood.

If he didn't go to prison, he'd like to get married.

He denied abnormal sex drive. He used adult pornography occasionally to relieve sexual stress. However, he tried to "keep his mind out of the gutter."

He reported a long-standing difficulty of feeling life was not worth living. He attempted to kill himself during his midteens by stabbing himself in the stomach. Apparently a friend, a girl, stopped him. His motivation for stabbing himself was that his girlfriend had kissed another guy. He felt no violent thoughts towards her.

He reported at least five episodes of suicidal thinking. This included putting the .38 caliber pistol to his right temple and almost pulling the trigger during his midteens. It was loaded and the hammer was pulled back. He believed a "higher being" or an "angel" came to him, distracted him, and gave him the message "don't do it, there is hope." After that, he decided become "clean from drugs."

Though he had been suicidal more than five times, he hadn't otherwise acted on it. He had no plans for suicide because the thoughts tended to be short lived "impulses." He would never stage a suicide to look like an accident and had not thought about provoking someone to harm or kill him. In particular, he would not try suicide by cop because he liked the police and the FBI.

He reported lifelong auditory experiences that seemed like hallucinations. The hallucinations were accompanied by "three" different personalities; "Alex," "Alexander," "Evan," and "Blair." "Alexander" helped him feel safe and was a protector. "Evan" was a lover and "sex machine." "Blair" was "bat shit crazy and scary." Alex was "here and present!" who "gets bad shit to happen to him." He acknowledged these were different facets of his personality that he used to "explain his emotions." At times, they seemed like different personalities especially when he was angry but he never actually experienced a different tone of voice or sense that he was a different person.

He denied visual, gustatory, olfactory, and tactile hallucinations. He felt his personality was unstable with different identities but they were "four types" of his own personality, though he seemed to actually mean three types.

He reported poor memory, racing thoughts "all the time" due to ADHD, and OCD-like calming rituals such as washing his hands. He might wash his hands three or four times per day, especially when he worked at Motel 6. He didn't organize things obsessively or become preoccupied with repetitive prayers. Many times he felt he'd been somewhere before. That seemed to be a "trigger," which he might remind himself about later.

Sustaining attention was difficult for him and always had been. For example, he commented on a photograph, a book, and a number of items in the exam room because they distracted him and wanted to "take stock for later." His noticing the items seemed to derail his attention.

He reported feeling others were malevolent towards him since his teen years. He felt maligned by his classmates who made fun of him for being in Special Education. That experience continued with the FBI. He had felt at one point he was being followed because he saw a car "veer off" and then reappear. He was somewhat preoccupied with "body language tells," especially because many people tended to avoid him. That others avoided him was his consistent life experience. In school, the "Special Ed" para helped him so he could actually finish school.

He reported intermittent anxiety and with it a great deal of anxiety about the current case. He reported recurrent panic attacks. None had occurred since he was arrested by the US government. No panic attacks related to Islam. When practicing Islam, he had intended to remain peaceful.

He appeared to function in the low average range of intelligence. His fund of knowledge was in the low average range.

On formal testing, his attention and concentration was fairly normal. There were some intrusions of non-violent primary process thinking and odd speech patterns similar to intellectual affectations.

His recognition memory was impaired. He recalled three of three objects immediately, but at one minute only two objects, and at five minutes zero of three objects. When given choices to see if he could recognize them, Alex "took a stab" at the words. He managed to name two of three words but readily confabulated the third word. He "hoped" that this writer would correct him, a frequent habit for him during normal conversation. He did that many times per day as a usual coping and reorienting style. Similarly, he often relied on his mother and father to give him reminders. After another delay to test recognition memory (due to the reinforcement), he couldn't spontaneously recall any of the three words.

His categorical reasoning (similarities) was functional to concrete (**NB:** underdeveloped for his age).

His social judgment (reasoning through hypothetical situations) was rigid, inflexible, and overly inclusive (**NB:** underdeveloped for his age). He ultimately reasoned socially appropriately.

His abstract reasoning (proverb interpretation) was highly concrete, blocked, and immature for his age (**NB:** underdeveloped for his age).

His digit span, a clinical test for global brain dysfunction, was abnormal. He recalled six digits forward but only five reverse, with many attempts, suggesting right-sided brain impairment. Reciting six forward and six reversed is a normal finding.

There was no evidence of fine motor incoordination, constructional apraxia, or visual neglect.

COLLATERAL INTERVIEW/INFORMATION:

Tom Blair (July 7, 2015)

Tom Blair, Alex's adoptive father, noted that Alex had the diagnosis of Williams syndrome since birth. Alex's VSD was diagnosed at two or three weeks old and finally grew closed when he was 10 or 11 years old. Elements that were consistent with Williams syndrome included Alex's need for eye surgery, difficulty with enunciation (requiring speech therapy), and difficulties with social behavior. Alex was "behaviorally so outgoing" that he often didn't have friends. Alex often did not think about what he said, and often had to attempt to "slow his words down." Alex did not really get a handle on slowing down and making sense until he was an adult.

Alex always had difficulty understanding subtle meanings of words.

Alex tended to develop a 1 to 3 month intense focus on a particular idea or interest and then move on. Even so, he virtually always went to church, by himself every time. He enjoyed helping out at the Nazarene Church and always "wants to be part of something." Because of his social awkwardness, he wasn't always welcome where he went.

For a while, he was interested in Islam because he didn't feel a part of Christian churches. He tried to be a devoted Muslim for a while, but enjoyed eating pork and enjoyed being around women. At first, Alex saw nothing wrong with Islam and focused on diminishing general prejudice against Muslims. Because of his current case, he avoids contact with any Muslims.

About his US Air Force service, Mr. Blair had talked Alex into enlisting, thinking it would be a great experience for him. Alex's physical stature, difficulties with anxiety, difficulties with esophageal reflux, and scoliosis made military service quite difficult for Alex. Mr. Blair hadn't quite thought that through when he recommended Alex join the service.

Always, Alex "says what you want to hear" due to Williams syndrome. He never had anger control problems.

In retrospect, when the FBI interviewed Alex, Mr. Blair did not realize that Alex was actually being interrogated as a suspect and not just being helpful to them about Mr. Booker. Mr. Blair wishes he had stepped in due to Alex's Williams syndrome vulnerabilities.

Jane Blair (July 24, 2015)
Mrs. Jane Blair provided an article entitled "*What is Williams syndrome*?" This was from Williams-syndrome.org. In particular, she noted that Alex experienced facial characteristics of Williams syndrome. These included wide mouth, upturned nose, and need for eye surgery (at four years of age). He also had heart and blood vessel problems including VSD with congestive heart failure.

He demonstrated general physical characteristics typical of Williams syndrome including adult stature smaller than average. She noted that Alex was 5'8" tall however his birth father was 6'6" and birth mother 5'10". Alex had infantile colic and ongoing gastroesophageal reflux disease. He had dental abnormalities for which he required braces. He experienced hyperacusis (sensitive hearing). He had musculoskeletal problems such as scoliosis due to impairment of elastin formation, a consequence of the chromosomal deletion. Last, Alex was "overly friendly" (excessively social). She noted that Alex was very friendly but often made out of place comments. He wanted friends, was very social, was loving, was very empathic, was nonjudgmental, every day told her "I love you," and had a pattern of hugging everyone, yet his feelings were easily hurt and he suffered anxiety.

Regarding developmental delay, learning disability, or ADHD, Alex was diagnosed with ADHD in childhood, experienced delayed walking and speech, required a speech therapist, and required an occupational therapist. He benefited from early childhood programming at age 3 ½ years old. Relatively, he experienced intellectual strengths in speech and interpersonal interaction but had difficulty with other intellectual tasks that caused emotional distance due to his somewhat odd mannerisms.

Mrs. Blair also forwarded an article entitled: *What Happens When You Trust Too Much*. This was in *The Atlantic* magazine noting that those with Williams syndrome are "pathologically innocent." In the past, such persons were described as having "cocktail personality syndrome." Such children have to be taught the concept of distrust and have difficulty learning how to protect themselves. They experience a multisystem disorder with low levels

of physical endurance, higher risk for diabetes, higher risk for hyperthyroidism, and higher risk for cardiovascular disease.

She noted that behaviorally, those with Williams syndrome are friendly, socially interested, show high levels of empathy, are easily distractible, have difficulty focusing, and have difficulty getting work done. They have difficulty with visuospatial construction. They have difficulty with interpersonal interactions and often "overdraft their bank accounts buying lunch for coworkers." There was variability in the cognitive difficulties. Primary interpersonal tendencies include high sociability, strong language skills (compared to others with chromosomal deletions), and strong verbal skills, relative to IQ score. There was a decreased sense of understanding social threat and difficulty focusing during interpersonal interactions in a way that prevents distraction. Anxiety was common.

In Mrs. Blair's view, Alex felt sorry for Mr. Booker. It also would've been in Alex's basic nature to "do things to maintain a friendship" with Mr. Booker even if others recognized manipulation that Alex did not. Alex told her he didn't feel that Booker "wanted do it," meaning bomb Fort Riley. Before his interactions with Mr. Booker, Alex was well known for "paying someone" in his neighborhood to maintain his friendships. This had been going on since Alex was eight or nine years old. He had a "helper mindset" often to his own detriment.

Alex often wanted to find social acceptance whether it was with his friends at school or the various congregations he attended. He was never shunned or excluded from any religious congregation. He was not particularly analytical and often changed his mind without appreciating consequences of prior decisions. He often "misspoke" and "likes to talk."

DIAGNOSTIC FORMULATION:

The current diagnostic model is the DSM-5, in use since May 2013. The DSM-IV-TR Axis system was not preserved.

Williams syndrome (micro-deletion of 16 genes on chromosome 7q11.23)
(Well-documented in Children's Mercy, Northeast Kansas Special School District records, Menninger Clinic records, and Social Security Disability records)
Adult Attention Deficit/Hyperactivity Disorder (ADHD)-Combined
(A consequence of Williams syndrome)
Anxiety Disorder NOS
(A consequence of social/interpersonal difficulties due to Williams syndrome)
Depressive Disorder NOS
(A consequence of social/interpersonal difficulties due to Williams syndrome)

There was no evidence of defensive minimizing or malingering (exaggerating or fabricating psychiatric/developmental symptoms he did not actually experience). Notably, the "cry for help" or exaggeration detected in psychological testing (PAI and MMPI-2) are consistent with his difficulties with written and verbal comprehension, well-established as a consequence of Williams syndrome. His testing "exaggerations" were not evidence of predatory, antisocial, or psychotic mindsets.

DISCUSSION:
The following bolded questions were posed for the Mental Evaluation. There may be some overlap for clarity.

Mental Disease or Defect (Diagnostic Formulation)
Mr. Blair demonstrates cardinal symptoms and signs of Williams syndrome. As a consequence of this chromosomal deletion disorder, he does not have the normal appreciation for subtle interpersonal interactions, awareness of danger, or normal feelings of interpersonal warning. It places him at considerable risk due to his "cocktail personality" (high level of approachability and need for affiliation with others) for easy manipulation because of his social naïveté and desire for social affiliation.

Factors associated with Williams syndrome, observed in Alex Blair:

- Small physical stature (Alex- 5'8", birth father- 6'6", birth mother- 5'10")
- Low birth weight
- Small head circumference
- Hyperacusis
- Scoliosis
- Wide mouth
- Upturned nose
- Repair of ocular strabismus (eye muscle imbalance)
- VSD (resolved)–ventricular septal defect of the heart wall
- Relatively spared intellect with biologically impaired warning/threat awareness system
- Learning Disorder
- Attention Deficit Hyperactivity Disorder
- "Out of place" comments but very social, loving, empathic and non-judgmental

There was no indication of predatory behavior. There was no indication of compulsion-driven or delusional/hallucination-driven militarized or violent preoccupations. He certainly professed no particular interest in primary Al Qaeda, Islamic terroristic, or ISIL/ISIS leaders, and concepts. His Williams syndrome personality likely would've compelled him to speak his mind if he held such beliefs.

He has never been perceived by his family, school, or church community as violent. Similarly, he was not excessively preoccupied with guns, first-person shooter video games, or explosives. Though he felt significant social isolation and was bullied in school, he did not develop any proactive or retaliatory violent plans toward the USA. Similarly, in the MMPI-2 and PAI, there was no overriding antisocial mindset, preoccupation with violence, or lack of empathy with others.

He was a simplistic thinker, likely biologically-mediated, meaning as a consequence of the chromosomal abnormality. There was no indication of grudge holding. From a mental status perspective, he has "concrete thinking," which is evidence of Learning Disability as normal 28-year-olds show more sophisticated reasoning patterns such as functional or abstract thinking in their reasoning. His concrete thinking (face value reasoning) is evidence of severe and permanent developmental delay.

He frequently misspeaks words such as "condone for condemn." This is part of his attempt to appear "sophisticated" and well educated, somewhat counterbalanced by his social naïveté. Compounding this problem, was his strong need for affiliation so often continues to

talk through areas of misunderstanding, hoping that those around him will correct him or he will pick up more subtle meanings from extended context.

He has great difficulty keeping friends, so has a bit of a "puppy syndrome." That is, he easily latches onto those who show him positive feedback, without much of a warning system whether such trust is warranted. He was likely to not understand his own social vulnerability to be manipulated by others. He experiences social discomfort due to awareness that his Williams syndrome contributes to his social awkwardness.

Due to the Williams syndrome, he is overly trusting. He can readily be supervised due to his desire to please those around him.

He is quite readily honest, perhaps too honest, and not given to subterfuge. At times, he answers perfunctorily without listening carefully to the question asked. While many people do that, he didn't seem aware of his potential for misunderstanding, answering the wrong question, or incorrectly assuming he knew what the full question was about.

There were no compelling fantasies of paramilitary preoccupation, identification with terrorist groups, and preoccupation with weapons. There was no preoccupation with Special Forces, Navy Seals, ISIS, or any other militarized group.

His problem solving ideation was somewhat rigid, due to his developmental difficulties, suggesting he would not be an independent mover in any kind of "terrorist plot."

There was no indication of contributory substance abuse. He had no prior legal difficulties.

He had already "moved on" from Islam back to that the Nazarene Church, where he experienced accountability and acceptance. There was no indication of abnormal behavior at the Nazarene Church or Methodist Church, in particular no excessively righteous or religiously-driven compulsions. There were no militaristic compulsions or idealistic devotion to changing the "world order" through apocalyptic or violent acts.

At the time of the charged offense, he was a neophyte Muslim, barely understanding many of the terms he was using. Clearly, he had developed a short-term intense interest in Islam as a part of his multiple short-lived episodes of "life learning" but such focus did not result in radicalized thinking. His father noted that Alex often develops a "1 to 3 month" intense focus on a particular new topic and then moves on, somewhat uncritically.

Alex Blair viewed himself as trying to prevent Mr. Booker's acting on what he thought were foolish/dangerous ideas. Due to Alex's chromosome 7 deletion with developmental naïveté, he was unlikely to perceive malice by Mr. Booker. As a consequence of his impaired brain development, Alex was likely to feel compassion for Mr. Booker and try to help or rescue him, rather than warn others.

Alex's other psychiatric difficulties are related to his Williams syndrome. These include:

ADHD-combined type
Alex Blair demonstrates persistent symptoms of DSM-5 adult Attention-Deficit/Hyperactivity Disorder (ADHD)-Combined Type. DSM-5 ADHD includes at least five of nine symptoms of inattention and at least five of nine evidences of hyperactivity and impulsivity. These had to

have been present before 12 years-old, which was the case for Alex as he was born with a developmental disability. He was diagnosed in 1995 with ADHD at the Menninger Clinic and then in 2006 during his Northeast Kansas Education Service Center IEP. Thus he had individualized assessments at 8 years-old and 19 years-old demonstrating ADHD in addition to the Williams syndrome difficulties.

The inattention symptoms must be inconsistent with developmental level and directly impact negatively on social and academic/occupational activities. The nine inattention symptoms include:
Failing to give close attention to details or makes careless mistakes in school work or work,
Often has difficulty sustaining attention task or play activities,
Does not seem to listen when spoken to directly,
Often does not follow through on instructions and fails to finish schoolwork,
Often has difficulty organizing tasks and activities,
Often dislikes or avoids tacit require sustained mental effort,
Often loses things,
Easily becomes distracted by extraneous stimuli,
Often forgetful in daily activities.

Hyperactivity and impulsivity features must be inconsistent with developmental level and directly negatively impact on social and academic and occupational activities. The nine include:
Fidgeting or tapping feet or squirming,
Leaving seat in situations when remaining seated is expected,
Running or climbing in situations where inappropriate,
Unable to play or engage in quiet leisure activities,
Being “on the go” or “driven by a motor,”
Excessive talking,
Blurting out answers before questions are completed,
Having difficulty waiting turn,
Interrupting or intruding on others.

Specifically, Alex demonstrated difficulty with attentiveness by his difficulty focusing on significant details, tends to move from new interest area to interest or area (difficulty staying on topic) with little continuity between, avoids tasks that require sustained mental effort, needs supervision by his parents (often loses things) and easily becomes distracted by extraneous stimuli.

He demonstrated hyperactivity/impulsivity features due to his feelings of social incompatibility, high level of expressed energy, excessive talking, answering before questions complete, and excess anticipating answers and responding.

From face-to-face examination and psychological testing, he tends not to be able to focus on pertinent details (misinterprets written language), skips over topics, has difficulty with not interrupting, focusing on minutia (wanting to remember things for later), having attention derailed by stimuli within the exam room, and other symptoms consistent with current adult ADHD.

His ADHD is a consequence of the chromosomal deletion and Williams syndrome. No illicit substances, traumatic brain injury, independent obsessive-compulsive disorder, intrusive schizophrenic spectrum disorder, or cyclical mood disorder contributed.

Anxiety Disorder NOS
Anxiety described in the DSM-5 usually is related to a specific condition such as separation, mutism, phobia, social anxiety, panic disorder, panic attack, agoraphobia, generalized anxiety disorder, or substance/medication induced anxiety disorder. Mr. Blair's anxiety appears consequent to his medical condition (Williams syndrome). Throughout his life, he has felt socially isolated, in need of social contact (highly empathic), and seeks high levels of interpersonal affiliation despite multiple episodes of being rebuffed. Until fairly recently, he was less aware of his social awkwardness, but aware of being shunned by others, and fully aware of never really fitting in. With the current federal charges, his level anxiety has increased, social awkwardness increased, and he often feels overwhelmed.

Depressive Disorder NOS
Mr. Blair gives a history consistent with stress-mediated depression, in particular related to interpersonal difficulties. He had some five or more episodes of suicidal ideation. This was predominantly consistent with DSM-5 Persistent Depressive Disorder (dysthymia) as he had suicidal thoughts and once put a loaded gun to his head as a teenager, but that intensity has subsided. The suicidality and depression was likely related to situational anxiety and limited cognitive capacity to process dissonant internal feelings. He would not kill himself now and did not have ready access to firearms.

It is of note that his current treatment with 20 mg, or 40 mg, of fluoxetine each day (generic Prozac) under the care of Dr. Smith has been somewhat helpful to reduce the intensity of anxiety and depression.

Taken together, 29-year-old Alex Blair experiences a combination of Mental Defect (Williams syndrome) and Mental Disease (adult ADHD, anxiety disorder, and depressive disorder). These difficulties were evident before, during, and subsequent to the charged offense.

Discussion of Williams syndrome Relevance to Mitigation
From a clinical, descriptive, standpoint, Alex Blair demonstrates characteristic physical, developmental, intellectual, and interpersonal difficulties directly related to Williams syndrome. The Williams syndrome was present from before birth due to the micro-deletion of 16 genes on chromosome 7. Relatively, Alex's intellect was spared. That is, he demonstrates near normal intelligence, however he experienced abnormal-brain-development mediated communication and interpersonal difficulties which directly contributed to his vulnerability to manipulation by Mr. Booker.

From a clinical standpoint, there is no question of that Alex Blair experiences Williams syndrome. Medical records indicate initial physical abnormalities were first identified in January 1987 (VSD), with small head circumference, and low weight. Williams syndrome was specifically diagnosed in 1990, 1995, and 2006, and then continuously was a factor throughout all of his diagnostic assessments and schooling. As an adult, he has demonstrated principal Williams syndrome physical and behavioral characteristics.

One of the primary questions left is whether his brain abnormality causes any demonstrable difficulty with clinically meaningful impairment of capacity to anticipate threats or perceive

negative behaviors in others that might put him at risk. All, while at same time not creating a greater likelihood of recidivism or antisocial behavior.

First, in Kaplan and Sadock's Comprehensive Book of Psychiatry (seventh edition), published in 2000, Williams syndrome is identified on page 2601, 2604, 2605 as one of the cross-domain forms of mental retardation (now Intellectual Disability) with extra deficits in visuospatial processing and heightened abilities in language. Detection of difficulties due to Williams syndrome include understanding neuropathological process, assessing communication deficits, understanding personal vulnerability to exploitation or abuse, elucidating inadequate coping skills, limited ability to use social relationships, limited repertory of social skills, and reduced opportunities for development. In addition, Williams syndrome is a recognizable phenotype (observable physical or biochemical characteristics) where evolution of manifestations occurs over developmental stages.

In summary, Williams syndrome is a well-established chromosomal abnormality, evident from birth with lifelong consequences. That put Mr. Blair at the level of someone who needs protection due to developmental limitations.

Second, in, *Comprehension of sarcasm, metaphor and simile in Williams syndrome* (by Keli Godbee and Melanie Porter, International Journal Language and Communication Disorders November-December 2013, volume 48, #6, 651-665, persons with Williams syndrome are characterized as friendly and sociable with relatively good general language abilities but often have pragmatic difficulties and trouble comprehending aspects of non-literal language. Williams syndrome persons were examined to understand their capacity to perceive non-literal language.

Persons with Williams syndrome tended to experience significant lower IQs than typically developing chronologically aged matched controls. Individually, persons with Williams syndrome had impaired expressive vocabulary, impaired verbal working memory, impaired perceptual integration, and impaired inferential reasoning ability as compared to typically-developing chronologically age matched controls. Verbal working memory and inferential reasoning were also significantly impaired in persons with Williams syndrome even compared to mental age matched controls.

From practical standpoint, persons with Williams syndrome perceived sarcasm (the use of irony to mock or convey contempt), metaphor (applying a figure of speech to an action or object which is not literally applicable; symbolic of meaning something else), simile (figure speech involving comparison of one thing with another to make it more emphatic or vivid; "as brave as a lion" or "crazy like a fox"), and literal comprehension in a very impaired way relative to normal-developing controls. Even with training, Williams syndrome persons did not gain as much in perceptual integration and overall cognitive ability.

Persons with Williams syndrome perform significantly below the level of typically-developing chronological age-matched controls. On all measures of non-literal language persons with Williams syndrome have much more difficulty interpreting sarcasm and metaphor due to overall lowered cognitive ability and verbal comprehension skills. Comprehending metaphor and sarcasm is generally beyond the developmental language capacity of persons with Williams syndrome. Capacity to appreciate metaphor and sarcasm develops through middle school and is still improving at age 12 or 13 years-old, which is above the typical developmental age of most persons with Williams syndrome.

Hyper sociability in Williams syndrome has been well documented. There is a bias towards happy faces, in conjunction with eagerness to please and sociable personalities. It is possible that persons with Williams syndrome are biased toward more "happy" interpretation of sarcastic comments than typically-developing controls. The bias is likely to arise from a more literal interpretation of sarcastic comments as the literal interpretation of sarcasm is often nicer and happier than the actual intent. Such persons may miss sarcastic rebukes. That is because sarcasm is more demanding on higher order executive abilities such as suppression, cognitive flexibility, and integration of context. Persons with Williams syndrome are likely to not perceive simile, metaphor, and sarcasm due to significantly poorer inferential reasoning abilities.

From a practical standpoint, persons with Williams syndrome are likely to understand non-literal language at the level of their mental age not their chronological age. Thus, it is of particular importance to monitor understanding when using non-literal language around persons with Williams syndrome. Such persons are not likely to monitor if they've understood what they have heard and even if they are aware of misunderstanding they tend not to ask for clarification.

In summary, persons with Williams syndrome are unlikely to understand non-literal language at the level of their chronological age, are unlikely to monitor if they've understood their verbal interactions with others, and are unlikely to ask clarification of things they do not understand. Also, due to their bias toward "happy" interpretations of subtle communications and in particular deceptive interactions by others, they are likely to internally interpret these as positive interactions and go along.

Third, in *Severe Expressive-Language Delay Related to Duplication of the Williams-Beuren Locus*, Somerville et al the New England Journal of Medicine October 2005; 353:16, 1694-1701, persons with Williams syndrome demonstrate severe delay in expressive speech in a dosage related way. In Williams-Beuren syndrome (Williams syndrome), there were characteristic developmental delays, spatial ability weakness, relative strengths in expressive language, excessive social attention, ADHD, hypersensitivity to sound, broad forehead, ocular problems, wide mouth, low birth weight, growth retardation, musculoskeletal problems, and cardiovascular problems.

In summary, Mr. Blair demonstrates highly specific physical, cognitive, and emotional evidences of Williams-Beuren syndrome (Williams syndrome).

Fourth, in *Williams syndrome: A surprising deficit in oromotor praxis in a population with proficient language production*, in Neuropsychologica (2015) 82-90, persons with Williams syndrome showed surprising impairment in the ability to perceive non-linguistic oral movements. This was thought to arise from impaired ability to reproduce syllables when visually presented. Such persons have difficulty in the initial phase of learning auditory-motor sequencing, especially when learning visual motor sequences. Such persons may have greater problems with novel and unpracticed visual motor sequences because they will not extract and generalize common features adequately. Such persons will have surprisingly poor imitation and sequencing of complex non-linguistic oral movements as assessed by oromotor praxis tasks relative to typically developing children. This impairment will contribute to language delay during early development.

In summary, persons with Williams syndrome do not perceive oromotor tasks normally and may have ongoing difficulties perceiving oromotor subtleties in adulthood.

Fifth, in *Facial emotion processing in patients with social anxiety disorder and Williams-Beuren syndrome: an fMRI study*, Journal of Psychiatry Neurosciences December 2015(early release) by Binelli and others, persons with Williams syndrome showed impaired facial emotion processing. That is, functional MRI for all faces (such as angry, fearful, happy, faces vs. shapes) compared to age-matched normal controls showed significant inclination of Williams syndrome persons to match happy faces with subsequent activation of the right amygdala. Persons with Williams syndrome showed no activation of the amygdala under angry or fearful threat (face) conditions. This may have been mediated by less activation in the posterior primary visual cortex and significant deactivation of the right middle temporal gyrus/temporal operculum and right supplementary motor area.

While limbic activity did not differ among study groups, there were major differences in early visual areas of the face processing network in patients with Williams syndrome. This group differed in activation of the superior temporal gyrus activation to gaze processing. While previous studies demonstrated diminished amygdala response to negative facial expressions for persons with Williams syndrome and heightened amygdala response to happy faces, a pattern that might explain part of the hyper social fearless behavior typical of the population, this study demonstrated amygdala activation for Williams syndromes under "happy conditions." In addition, fMRI matching angry or fearful faces did not produce amygdala activation in the Williams syndrome group. This may have been due to impaired function of the posterior region of the primary visual cortex so that persons with Williams syndrome fail to accurately process facial features and fine-grained details. Thus, they rely on coarse (lower resolution; less detailed) or holistic impressions. The inability to process facial expressions and detect threat signals contributes to the fearless social phenotype and difficulty detecting typical threat-related signals. Further, Williams syndrome persons have difficulty matching fearful faces, which is a more difficult emotion to process, and demonstrate this by less activation of the bilateral temporal operculum and insular regions as compared to controls.

In summary, functional MRI imaging of persons with Williams syndrome demonstrates complicated changes in the visual processing apparatus so that they are less likely to perceive fear or threat (negative facial expressions) and more likely to interpret facial expressions as happy and align with that expectation. Parts of the brain that signal perception of threat or anger don't activate when persons with Williams syndrome are faced with such stimuli. From a practical standpoint, persons with Williams syndrome are unlikely to experience brain activation that signals they are in a dangerous environment or should be fearful.

Taken together, the five citations illustrate Williams syndrome is a well-established Intellectual Disability with manifestations that evolve over time, that persons with Williams syndrome are developmentally unable to perceive important non-literal communication strategies (metaphor, simile, sarcasm), that Mr. Blair demonstrates classic incontrovertible signs/symptoms of lifelong Williams syndrome, that persons with Williams syndrome never develop normal capacity to interpret facial expressions, and functional MRI demonstrates that the brains of persons with Williams syndrome do not register fear or threat in a normal way and they are likely to interpret most facial expressions as happy or welcoming, even if the is an inappropriate response.

From a psychiatric perspective, Mr. Blair's participation with Mr. Booker would always have been at a subordinate level. Mr. Blair's Williams syndrome predisposed him to feel empathically aligned with Mr. Booker to try to help him, as he felt aligned with most others even those who shunned him. Mr. Blair's life pattern demonstrated such a pattern. In addition, research relating to impaired language development, impaired oromotor praxis (developmental mimicking of normal facial expression understanding), and impaired brain activation clearly demonstrate that Mr. Blair was biologically (mental defect) predisposed to be unable to perceive the danger of, process alternative interventions for, and to contravene Mr. Booker's actions. He was more likely to try to "align" with Mr. Booker to convince him of "happier" path. Mr. Blair would've been unable to perceive the fruitlessness of that task by virtue of his lifelong developmental impairments. He also would have been much less likely to seek assistance if he felt that he could not change Mr. Booker's path, even if he perceived it as dangerous or threatening, which he was biologically predisposed to be unable to perceive.

Impact on Sentencing/ Mitigation

Mr. Alex Blair participated in the actions with Mr. Booker without normal adult mental capacity. From a psychiatric perspective, a number of factors would suggest reduced culpability. In no order of priority they are as follows:

Mr. Blair experiences lifelong effects of Williams syndrome, which made him biologically predisposed not to perceive the seriousness of Mr. Booker's threat. In addition, his Williams syndrome made him more likely to be manipulated by Mr. Booker than the average person.

Mr. Blair's Williams syndrome made it much less likely that his brain would even perceive Mr. Booker's language subtleties as dangerous or threatening. Even if he perceived them, Mr. Blair was biologically predisposed to assume a happier outcome, assume a happier interpretation of Mr. Booker's words, and develop a hopeful "intervention" strategy to dissuade Mr. Booker even if that was not possible and Mr. Blair didn't realize it. Similarly, he would have shown the same deficits in any law enforcement assessment.

No alcohol dependency, drug dependency, schizophrenic spectrum disorder, cyclical mood disorder, antisocial personality, antisocial adult behavior, or violence-oriented mindset is evident in Alex Blair's functioning.

Mr. Blair did not demonstrate any overriding violent tendencies, grudge holding, prior legal difficulties, exploitative mindset, antigovernment stance, militaristic focus, or committed extremist state of mind that might make him an ongoing danger. In addition, his Williams syndrome makes it more likely that he would not be able to hide such thinking if he actually harbored it.

Mr. Blair has a very motivated, well-informed, family who can assist with supervision. In addition, Mr. Blair demonstrates compliant personality features that suggest he would be able to fully cooperate with US probation.

Mr. Blair is capable of regular low-demand employment such as at the Oskaloosa Country Club where he is well known and reportedly a good worker. His thinking is somewhat concrete and problem solving somewhat "rigid," meaning not very flexible, but he does not demonstrate any overriding extreme religious views of any type.

Mr. Booker is obtaining help from antidepressant medications and psychotherapy interactions with Dr. Smith. He has strong ties to the Topeka community, including church groups, which help provide a surrounding structure of accountability. Ongoing psychotherapy with Dr. Smith, who may function as Dutch uncle, will better teach threat perception/avoidance habits, maintaining alignment with parental support, and cooperation with Probation or Parole.

Incarceration would be very detrimental due to Alex Blair's biologically-mediated lack of threat awareness. Even though he is loquacious and can interact with verbal abilities that are at the near normal IQ level, his chromosome-deletion mediated language processing impairments are permanent. In prison, his Williams syndrome mediated behavior will readily prevent his perception of threats from others. He is biologically "hardwired" to misinterpret threats as positive interactions. He may uncritically affiliate with those he perceives as friendly to him. He may even yearn for contact enough to align with anyone. That puts him at extreme risk for sexual, physical, and interpersonal exploitation in prison. Such exploitation would further damage his gullibility, and may prevent him from letting go of a penitentiary mindset when released. Even more ominously, out of an instinct for physical survival, he may mold his behaviors toward violence and then be unable to let that go once released from custody. From a psychiatric perspective, putting him in a penitentiary could very much result in his experiencing physical, sexual, and emotional traumas. These would leave him further damaged (through persistent post traumatic reliving or flashbacks, potentially physical injuries, and permanently altered trauma pathways in the brain) and still inherently without a biological ability to deal with complex traumatic life events.

Last, there was no indication of intentional deception, malingering, or any attempt to derail the evaluation by Mr. Blair. He cooperated fully, within the limitations of his Williams syndrome.

Thank you for consulting Logan & Peterson, PC. If any new issues have arisen or any element of this report needs clarification do not hesitate to contact me.

_____E-signed SEP, MD @23:20 on April 26, 2016_____
Stephen E. Peterson, MD
Diplomate, American Board of Psychiatry and Neurology 1992
ABPN Subspecialty in Forensic Psychiatry 1994, Recertified March 2003

7-30-16

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S.E. Quincy, Suite 405
Topeka, KS 66683

RE: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

I am Alex's mother, Alice "Jane" Blair. To tell you a little about myself. I am an Irish Catholic raised on a farm near Perry, KS. I went to Perry schools and graduated Valedictorian of my class. I worked for Topeka Medical Center for 15 years at which time the doctors broke up their partnership. Many of the doctors asked me to come work for them, so I thought it might be a good idea to start my own medical transcription business. I did medical transcription for many years out of my home. I now work for John Dewey Learning Academy, an alternative school for Jefferson County. I have worked there for 7 years. I love my job--love the kids!

My husband and I adopted Alex from the Catholic Social Services in Kansas City in December of 1986. He was about 3 days old at that time and we were told that he had a heart defect. He saw Dr. Dennis Cooley, Pediatrician, 3 weeks later. At that time he was in congestive heart failure, and he was immediately taken to Stormont-Vail Hospital for treatment and was placed on heart medications. We then had to take him to Children's Mercy Hospital in KC for regular examinations by Dr. Hubbell, Cardiologist. When he was about 3 years old Alex was diagnosed to have Williams Syndrome. A FISH test confirmed this. Williams Syndrome is when chromosome 7 is missing, which affects 20 or more genes. This affects the person both physically and mentally. Only about 1 out of every 20,000 to 30,000 people are affected by Williams Syndrome, but there are many sources out there which explain it.

As a result of Williams syndrome, Alex has had the following--

1) ventricular septal defect
2) congestive heart failure
3) scoliosis
4) problems with elasticity
5) strabismus with eye surgery performed by Dr. Dan Weaver
6) gastric problems which have bothered him constantly
7) Acute hearing. At school he was allowed to do work in a quiet place.
8) Those with Williams Syndrome have a lower life expectancy.
9) poor social skills and trouble making friends

Mentally, Alex has--

1) anxiety
2) some depression
3) extreme obsession on something, which will soon change to something else
4) poor judgement

We have applied several times for disability for him as it is hard for him to get and keep a job long enough for him to obtain health insurance which he needs desperately. He has been denied disability, partly I believe because Williams is rare and not understood. Alex has come far due to all care possible given to him. We worry about what will happen to him after we are gone--no job, no health insurance, etc.

Sometimes I think we did too much for him growing up. Alex did not start talking or walking until he was about 3 years old. We got him in speech therapy and occupational therapy for his poor motor skills. We entered him into an early childhood program which he attended for two years before starting kindergarten. When he saw Dr. Baker, Orthopedic Surgeon, for his scoliosis, Dr. Baker stated that swimming would help it. We put an in-ground pool in the back yard. Alex has had counseling to help him better cope with his disability. He saw Dr. Kenneth Ensroth at The Menninger Foundation until Menningers moved to Houston, TX. Alex, as well as others with Williams, is extremely kind and loving. While growing up, every day he told me that he loved me. He hugged his teachers and bus drivers. He is not judgmental and has told us not to be that way. Alex's chatter will be off the wall at times. He is social, and desperately wants to make friends.

Alex has never been in trouble for anything. He does what he is supposed to do always.

Alex is not a terrorist, but used poor judgment in associating with Mr. Booker.

As an aside, when the FBI came into our home, I felt they were very deceptive.

As to what I think should be Alex's punishment, being his mother, I know what a struggle he has had. Knowing Alex probably better than anyone, I can tell you he probably is the best person I know. He is caring, loving and would not hurt anyone. Putting someone in prison like Alex, who was not fully understanding the severity of his lending Mr. Booker a small amount of money, seems unbelievable to me. He would be eaten alive in prison. I do believe Alex has learned his lesson. I pray you understand that Alex would never wish anything bad to happen and that his disability had a part in his poor judgment.

Respectfully,

Jane Blair

Thomas Blair
[redacted]

July 31, 2016

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S.E. Quincy, Suite 405
Topeka, KS, 66683

Re: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

I am Thomas Blair, the Father of Alexander Blair. I graduated from high school and had some college credits. I was in the Air Force from 1964 thru 1968, and I am a proud Veteran. I was a Aircraft radio repairman on C130's here at Forbes. I went to work at NCR, National Cash Register, as a field engineer from 1968 to 1980. I spent 3 ½ years in technical schools with NCR. I took a field engineering job with Four Phase Systems in 1980. They were a small company that built and supported front end business computers. One of my customers was the Department of Agriculture in the Federal building. I also serviced equipment on Fort Riley and Fort Leavenworth. Motorola bought out Four Phase Systems in 1984 and in 1989 I transferred into a Cellular Field Engineering position and also a system engineer at times. I traveled all over the states and was the lead engineer on most of the jobs until I retired in 2007. I went to school or worked with people from all over the world. Some of them were from Israel, Pakistan, India and many more countries. They were all very nice and did not have any radical views that I knew about. In 2009 I came out of retirement to be a school bus driver at Jeff West and Perry. I still drive for Jeff West. I've been married for 48 years and we adopted Nicholas 36 and Alexander from birth. We have 3 grandchildren from Nicholas. I've been president of our home owners association in the past.

We adopted Alex from birth in 1986. We knew he had a VSD at birth and at his first doctor's appointment he was placed in the hospital with congestive heart failure. The first year he couldn't sleep at night in a bed, he had to be wrapped up in a blanket and placed inside a car seat. He had a hole in his heart that they determined would grow together over the years. I believe he was 10 or 11 when it was completely closed. It was Dr. Hubbell at Children's Mercy Hospital that tested Alex for Williams Syndrome with the FISH blood test. I think he was about 5 years old when he had eye surgery. He had trouble with his speech and we had him in speech therapy. We had special ear pieces that would give him feedback so when he talked he heard the feedback. He was constantly seeing doctors for his William Syndrome growing up and he surpassed all I believed he would be able to do by the different stages in his life. I've always worked at having him

be independent. He has always been loving and caring.

He has been going to church every Sunday for about the last 4 years to Fairlawn Church of the Nazarene. He helps assist with setting up events or breaking down after events and greeting people. He was also on the Security team at Fairlawn for a short while. When he went to the Topeka Islamic Center, I was not concerned because of the different international co-workers that I have worked with in the past. I never thought in my wildest dreams that Alex would meet someone like Booker in Topeka, KS. I'm sure Alex didn't either.

He has always been a good worker. He always shows up early and is willing to change hours anytime they would want him to change. His problem was that certain management would hear about his court case and would fire him. It will be hard for him having a record and his disabilities. He stays positive and does his best.

He brought Mr. Booker to our home once. Booker did all the talking and, excuse my words here, Alex seemed to be his bitch. He didn't let Alex talk and tried to control his speaking and actions. I thought Alex would get tired of this and move on from Booker in time. I do know that Alex came to me a few weeks before Booker went to Fort Riley, and didn't want to be in Topeka any longer. He wanted to find a job and move to Kansas City.

Alex is not a Terrorist nor has he ever been one. I have never heard him talk about anything radical. He has been the best kid, even this past 1 ½ years that he has been on probation. He helps me anytime I ask for help. He has always done what was right. He has never had a traffic ticket, not even a parking ticket. This is why I personally think that Prison would be considered overkill for Alex. I also have spoken with Alex about this and he has told me that he never wishes to have to go through something like this again, that it has been traumatic and wouldn't wish it upon another human being. I have taken classes of school children to the women's prison in Topeka to visit. I thought the noise of the prisoners was really loud for me with no insulation to dampen the noise in the building. I think prison would be very, very hard on Alex with his acute hearing and disabilities.

I'm 71 years old and would like to help Alex to advance in his life through his Williams Syndrome. I am asking you to please give Alex probation. I would be glad to have him at my house during that time. Thank you for your time to read this letter Your Honor.

Thomas Blair

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S.E. Quincy, Suite 405
Topeka, KS 66683

Re: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

I am writing this letter in support of Alex Blair, a former student of mine from Jefferson West High School in Meriden, KS. I currently teach at John Dewey Learning Academy, an alternative school in Ozawkie, KS. I first met Alex during the 2004-2005 school year as a student in my biology class. Over the years I have had many students that I probably wouldn't remember, but Alex made an impression on me and has always been a fond memory. Alex was a teacher pleaser, always coming into class with a big smile and a nice greeting, often engaging in a short conversation before class. He volunteered to help with classroom chores and even help other students with their lab clean up. He was friendly to everybody, making no distinction between whether another student was popular or not, nice in return or not, or interested in talking to him or not. The only time I saw him angry was when he saw someone being mean to someone else. He understood when someone was being mistreated, and as he didn't like it, he would come to his or her defense.

One day I announced that each student would research a genetic disorder and report their findings to the class. Alex came up to me and asked if he could research Williams syndrome. I was not familiar with that one, so I asked him about it. He told me that he had that syndrome, and wanted to learn more about it. This was the first time I had a student with a genetic syndrome wanting to study it for a science project. I was concerned about how he would feel when it was his turn to share his research with the class. As it turned out, he did a wonderful job, and I thought he was very brave to tell his classmates that he had this disorder.

I have run into Alex several times in Topeka since he graduated, and he still has the same sweet personality he had in high school when he would easily strike up a conversation and befriend anyone. Then I remember seeing his name and face on TV and was in shock! I couldn't believe Alex was being accused of a felony against the United States!! I called my husband to the TV and told him that I KNOW he was coerced

in some way and could not have understood the gravity of what he was doing, whatever it was.. I knew immediately that he had inadvertently made a friendly connection with a bad person. I felt so bad for him but didn't know what I could do. So when I met Jane, his mother, at my new school job last fall, I told her to let me know if there was anything at all I could do to help him.

I ran into Alex again this past January at the Ramada Inn where he was starting a new job behind the front counter. He smiled so big at me and was so proud of this job. He was dressed in a nice suit and looked and acted so professional! All I could think of was what challenges he has overcome in his life, and I was very happy for him to find such success, and acceptance from his employer. Of course anyone who really knows Alex would know that he is a good and honest worker, and will do everything he can as an employee to please you.

I firmly believe that Alex deserves a second chance. He needs guidance, but not a prison sentence. Alex is incapable of thinking like a criminal. When he loaned that $100, even knowing what it was for, I am sure in his mind he was just trying to be a good friend. All of Alex's accomplishments will be destroyed if he is sent to prison, even for a short-term sentence. It would not benefit him or society in any way to put him in that environment. I am sure he has suffered greatly, just becoming aware of and knowing that he did something so very wrong. As an educator of troubled children, I am aware of the struggles many young people have in simply interpreting situations and other's intents, and sometimes they get caught in a tangle they don't quite understand. This is what happened to Alex, I am sure. It is my belief that Alex is such a good person, that if he needed a place to live, I would offer a room in my own home to him.

Please give Alex probation, so he can get the guidance and support he needs right now to continue learning how to be a responsible adult. He shows so much promise, that it would be a shame to stop his progress now. I appreciate your time in reading this letter.

Thank you,

Sincerely,

Rena Kilgore

[redacted]

JEFFERSON WEST
Unified School District 340
P.O. Box 267 • Meriden, Kansas 66512 • 785-484-3444
A. Patton Happer, Superintendent

July 15, 2016

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S.E. Quincy, Suite 405
Topeka, KS 66683

RE: Alex Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

I have been an educator for 38 years with 25 years in the Jefferson West School District where I am currently the Superintendent of Schools. I have also been involved in several civic organizations including being a board member of the Meriden/Ozawkie Chamber of Commerce, The Guidance Center serving Atchison, Leavenworth, & Jefferson Counties and the Jefferson County Economic Development Committee.

I have known Alex Blair for more than 20 years, as I was the Principal at Jefferson West Elementary School when Alex attended grades K-5. I knew Alex all throughout his formal K-12 education. My son and Alex were in the same grade and spent time together in the Boy Scouts of America program for a few years. I saw Alex nearly every day during his formal K-5 education and still see him on occasion at school functions as he has a niece that attends our school. Alex was a student with an IEP during his formal education. His disability, at times, hampered his ability to develop lasting relationships with his peers. I found Alex to be likeable, friendly but typically awkward at times when communicating and with his peers. He was always expected to make appropriate decisions and was held accountable on those occasions when he didn't. He seemed to easily relate to adults especially those that interacted with him in a friendly manner. On occasion Alex might say something that would be inappropriate, but his intent never seemed to be malicious, more a reaction out of frustration. Alex worked hard to learn academically although at times he had to be encouraged to demonstrate a stronger effort when things became difficult. I don't recall a time where Alex harmed or had a physical confrontation with another student.

I am aware that Alex is being charged in federal court with conspiracy to commit an offense against the United States specifically along with some of the details surrounding his case, which is a serious offense. I could easily see someone taking advantage of the fact that Alex was friendly, wanting to help out a person he thought liked him without truly realizing the consequences of his kindness. A part of his disability would be the fact that he could be swayed to help out others who he felt were in need of assistance to right something that was perceived to be a wrong to them. In my heart I don't believe that Alex meant harm to others by his actions but more that he felt he was helping someone who appeared to like him and who manipulated Alex for his help.

I feel that Alex is truly sorry for his involvement in this situation and wishes this had never happened. When a young person with his disability struggles to have friends and when he does enter into what he perceived as a friendship he could easily be lead down a less than desirable path. Alex knows he made poor judgments and does not have issue with being held accountable. It is my opinion that prison time for Alex would not be a benefit to society rather it may very well take a young man with a disability and lead him down a more troubling path with a new peer group and role models being more of the same he just experienced. Subjecting Alex to potential abuse by others would not serve society. I believe with appropriate supervision and opportunities to do good Alex would make the correct choices. Alex will be a member of society and I urge Your Honor to provide probation and community service for him as I feel he will learn much more from that experience than one of prison time.

Alex is a likeable young man with a disability and I feel like he is a person that would benefit from a sentence that does not include incarceration. Thank you for allowing me to share my thoughts regarding Alex Blair.

Sincerely

Pat Happer

To Whom It May Concern

I have been asked by Alexander Blair to write a letter on his behalf. I met Alex in 2003 I was a paraeducator and Alex was a student under my supervision. He was in special education because of his diagnosis of William's Syndrome but did really well in class and didn't really need help from me with his studies. Alex was always helping others and volunteering to help me as well as his other paras when we needed anything. He worked very hard in all of our fund raisers as well as Job Olympics at Johnson County Community College.

After Alex graduated he began attending Fairlawn Church of the Nazarene. I had invited him to a music event we had going on there and he really like the church so he started to attend on Sundays. Alex moved away for a few years but when he came back he got in touch with me and began sporadically attending FNC again. He began spending time talking with some of the people at the church and even spent time talking with the security team there.

I once told Alex that we had missed him being at church on a Sunday when he was absent. He told me that I was the only one who would miss him there. I tried to convince him he had many people who considered him a friend and missed him when he was not there. No matter how hard I tried though, he just didn't believe he had friends there. He said he didn't consider any of them friends. I remember having the same conversations with him when he was a student. From the training I received before working with Alex I learned that people with William's syndrome struggle with friendships.

When Alex was arrested, I reached out to him. I was shocked. I couldn't believe that Alex could do the things he was accused of. I have never known Alex to be violent or even very angry. I've never seen him try to harm anyone or even say he wanted to harm anyone. I truly believe because of his condition he did what he thought would make someone else happy, to try to be his friend. That is the main thing I was trained to watch for when I worked with him. People with William's Syndrome will do whatever they think will make those around them want to be their friend. They have a great need to feel love and approval.

Since Alex was released, he has been at church almost every Sunday unless he was working. He greets people at the door, helps people carry things from their cars, and helps to clean and set up for our programs. He even walked some of our elderly attenders from their cars to the church doors when the parking lot was slick with snow and ice.

Alex has become a part of our church congregation and has gained many supporters there. When he is unable to attend, people ask where he is. They have come to see him as a permanent part of the church family. I have seen a difference in him since the arrest. He was working hard at his job, reaching out to church members for guidance, and has made real growth. Coming from someone who has known him since he was a high school student, I see a real change.

Thank you for hearing me out. I hope the things I have written will help you to understand Alex and see him the way I do.

Carla Butler

Eric Davies & Donna Sigl-Davies
[redacted]

June 25, 2016

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S.E. Quincy, Suite 405
Topeka, KS 66683

Re: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

We are writing as a character witnesses on the behalf of Alexander (Alex) Blair. Alex is Eric's first cousin.

We have been married for 23 years, have a daughter in college and are residents of Columbus Ohio. Eric is the principal consultant of Transformative Consulting, LLC. His work supports the growth and efficient operations of Federally Qualified Health Centers which are a safety net providing health care for the underserved. Donna is a clinical counselor and clinical supervisor in private practice. Her professional experience includes 12-years tenure in Juvenile Court and working with offenders of domestic violence.

Since we live in Ohio and Alex and his family are in Kansas, we see each other once a year during Uncle Tom's (Alex's dad's) annual visit with his sons and family. We've had the opportunity to feel close to the family and have watched Alex grow up. He has always been friendly, warm, empathetic, light-hearted in his teasing and playful. He is engaging with family members of all ages and appears to really enjoy the belonging he feels when we are all together.

From the time Alex was young it also was obvious that he is a bit different. Despite his warmth and social nature, he has demonstrated a social and physical awkwardness, including a slight speech defect. We heard stories of challenges he faced in school and with keeping up with his peers. We watched him struggle with how to transition to adulthood with confidence. Within the past year or so these challenges were explained with learning of Alex's diagnosis of Williams Syndrome. Recently (4/8/2016) *The Columbus Dispatch* had a story about Williams Syndrome. It was illuminating and explained a lot about what we saw as Alex grew up.

We are aware Alex admitted guilt to a conspiracy charge. We understand the serious nature of the degree of danger his complicity may have caused. We were shocked as neither of us could have imagined Alex carrying out or supporting violent or atrocious behavior.

Again, the *Dispatch* story provided insight. A national expert at The Ohio State University stated: "Those with Williams Syndrome have rare gifts... They're incredibly social. The have an admirable sense of empathy... That said, the friendliness and empathy can work against them. It can make them vulnerable, especially to strangers."

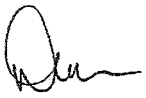
While neither of us condone Alex's actions, neither of us believe he is an on-going danger to our society. We believe his involvement in this crime is best explained through his vulnerability due to Williams Syndrome. Alex legitimately struggles with social awkwardness while he desires belonging and acceptance from his peers, in this case, he chose poorly where to find this acceptance and belonging.

Obviously Alex needs to be accountable for his actions. During sentencing, we hope the court will consider Alex's character and the role of the Williams Syndrome. We'd like to see Alex restore trust to the community through probation, community service and treatment so that he can be accountable for his actions in a meaningful way. We hope you will consider these factors in his sentencing.

Sincerely,

Eric Davies

Sincerely,



Donna Sigl-Davies

July 9,2016

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S. E. Quincy, Suite 405
Topeka, Kansas 66683

Re: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

My name is Nancy Blair Davies and I am the aunt of Alexander Blair. First, I will tell you a little about myself. I was born in July, 1938, in Ohio and have lived most of my years in Ohio. I have been married for almost 56 years. I have two children; a son, age 48, married with a 19 year old daughter. He is a college graduate and self-employed. His daughter is presently attending college. My daughter, age 43, is married, a college graduate and has two young children at home. I worked as an executive secretary for eight years at an insurance company right out of high school. I then worked at a large law firm (5 attorneys) for two years as a legal secretary and quit to start a family. I went back to work approximately five years later working for doctors in family practice, first as an insurance secretary and later also became the office manager. That lasted 22 years and then I retired. I have been active in my church most of the past 70 years. I have sung in the choir for many years, presently am chairman of the Board of Directors, and treasurer of the Memorial Fund. I also belong to a local music club.

I have known Alex since he was a baby and came from Kansas to Ohio to visit with his parents. Alex has an older brother and two nephews and one niece living in Kansas. He also has six cousins in Ohio. Alex has always been very loving and concerned. Alex was very good at giving back massages and his cousins would line up to get their turn. Eventually, he went to school to get a certificate in that field. I know that he has Williams Syndrome and has dealt with many problems growing up that others haven't had, both physically and socially. I have always found him to be loving toward family and friends. He always says "I love you, Aunt Nancy" when he knows I am on the phone with anyone in his home or in talking with him directly.

I pray the court will be lenient with Alex, as he poses no serious risk or danger to anyone, and prison would be detrimental to his well-being as well as to his health. He just needs future guidance to make certain he follows the right path and makes wise decisions. I am fully aware of the crime of which Alex is accused and has since plead guilty. He certainly was adopted into the best family possible and has been given the best opportunities, love and support.

Respectfully,

Mrs. Nancy Davies

August 9, 2016

Honorable Daniel D. Crabtree
District Judge
United States District Court
444 S.E. Quincy, Suite 405
Topeka, KS 66683

Re: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree:

Thank you for reviewing the information I am sharing regarding Mr. Alexander Blair.

I am the Senior VP of Adult Services with Easter Seals Capper Foundation (ESCF) in Topeka, KS. In addition to providing therapy to children, ESCF provides supports to adults with developmental disabilities. I have 29 years of experience working with adults with developmental disabilities and 3 years of experience working in the State of Kansas Department of Corrections in administrative positions. In addition to my work experience, I have earned my Ph.D. in Business.

I have known Alex for the past 24 years, as my husband and I are neighbors, living about 3 doors down from the Blair's. My sons and Alex played together, and attended the same small school district as youth.

I am aware of the crime for which Alex is to be sentenced. Quite honestly, because I have a son who served in the Army and at one time was stationed at Fort Riley and he served in Iraq and Afghanistan, I have struggled with my feelings regarding Alex's actions. After much soul-searching, I truly believe that Alex did not understand the magnitude of the decisions he was making. I sincerely believe that his poor social skills are the result of his diagnosis of Williams Syndrome. Alex has always struggled with truly understanding what a true friendship is, and has been quick to please others. Although his social skills appear at first blush to be those of a normal young adult, his skills are like those of an insecure child. Alex seems to me to be socially naïve. I have typically perceived Alex as a loner, trying to fit in with others. I do not see how a prison sentence will be beneficial for Alex or the general public. I believe Alex would benefit from the support of a community program who closely monitors his movements and his social interactions with others.

Thank you for considering the information I provided.

Respectfully,

Kathy Stiffler Ph.D.

Imam Omar Hazim

[redacted]

Honorable Daniel D. Crabtree

District Judge

United States District Court

444 S.E. Quincy, Suite 405

Topeka, KS 66683

Re: Alexander Blair, Case No. 15-40031-DDC

Dear Judge Crabtree

I am Omar Hazim, the Imam of the Islamic Center of Topeka, and the Islamic advisor to the Kansas Department of Corrections. I am on the advisory board to the Chief of Police, James Brown. I have lived in Topeka, KS since 1975. I have served on the board of directors for Interfaith of Topeka Inc. for seven years and have been associated with Interfaith for more than 30 years.

I am married, and have eight children who all graduated from Topeka West High School and went on to College.

I became acquainted with Alex about two years ago when he came to the Islamic Center of Topeka. Alex is a very sincere and sensitive person. Alex meet Jon Booker, who was a very troubled young man, who was receiving counseling, and also on medication.

I know Alex to be a very good and helpful person. Whenever he is at the Center, he always offers his assistance to the elderly in our community.

Alex has expressed to me in sincere ways, which he is aware that he made a serious and foolish mistake, and is very sorry for his actions.

Judge Crabtree, I ask you to show mercy on Alex and maybe grant him probation; I believe he will be of a better service to the community at large.

Respectfully

Imam Omar Hazim

Islamic Center of Topeka

Rexford K McCommon
[redacted]
7-11-16

Judge Crabtree
District Judge
United States District Court
444 SE Quincy, STE 405
Topeka, KS 66683

Dear Judge Crabtree:

I am an Associate Pastor at Fairlawn Church of the Nazarene (FNC), father of two daughters, and husband of 27 years. Further, I worked nearly 25 years for the Department of Transportation and 1 ½ years with the Department of Health & Environment mostly as a Database Management Analyst.

My relationship to Alex Blair in recent years is that of a pastor and friend. Alex attends FNC on and off for more than 4 years I believe. My contact with him is typically weekly where I greet him, get to know him, and encourage him. In addition, I taught a young adult class which Alex attended at times. Alex has helped with special ministry projects that benefit others. A specific example was when he helped me repair/replace portions of an elderly couple's deck. Another is watching him take initiative to go out in bad weather to help walk the elderly into the church. In my experience with him, he desires to be helpful and reliable and is growing as a person in beneficial ways.

Alex is like any human being. He needs connection with others and to feel wanted and loved. His need here is significant to the point of sometimes befriending questionable characters. Alex is a "follower" by nature. This is seen in his choice of connecting with Mr. Booker who took advantage of his personality traits. This occurred during a time period he was absent from FNC.

Beyond his intense relational need is a "conspiracy" mindset of which I do not know the source. He consumed information in the past which compromised his view of right and wrong. To this, we present alternate, health views of life. Had he had consistent, positive influence in his life filling his relational and philosophical needs, I believe his participation in the criminal activity would not have occurred.

Though he is an adult and ultimately responsible for his actions, there is evidence of negligence of the collective "we" of society that let him down. It saddens me that we did not sufficiently love and educate him, allowing him to fill the void with negative ideology.

While the offense is quite significant, I believe Alex to be a good person who admits he made a "stupid" decision. Alex has a heart to help people and do good things. In my view, he will not benefit by being locked up with a plethora of poor influence filling his head. If there is a community service program he could participate in redeeming his down time, enforcing solid ethics, and fostering relational connections, Alex will excel. He will feel fulfilled himself and bless others along the way while growing as a person in ways society will appreciate.

Thank you for your consideration. My statements are from my heart and what I believe to be true, though I cannot fully know the heart of another man. God be with you all and you serve us.

Respectfully,

Rexford K. McCommon

Rexford K McCommon