INAH⊗BSTc Entanglement of the physical-neuropsychological causes of terminal androphilia and transsexualism.

Abstract

Every transsexual knows about the findings of Zhou, that the BSTc is a structure in the brain which causes transsexualism. From this comes the idea of brain sex and "HBS". Most gay people know of the INAH as well as various other studies that point to a brain difference that causes homosexuality in biological males. I have shown that if both of these findings are confirmed true then concepts from quantum theory can be applied to shed light on the question "How is sexual orientation related to gender identity disorder?" A hot button topic. What I will show from neurological data, Hilbert space mathematics, and the first principles of quantum theory that gender identity and sexual orientation are quantum mechanically entangled.

Introduction

The "Bed Nucleus of the Stria Terminalis". From what we have seen in the work done on it so far there is no way to say that sexual orientation or anything else causes the difference Zhou observed in the BSTC. Let us also consider sexual orientation separately from this. There was another study one, before Zhou which found a nucleus in the brain that is different in homosexual biological males, and heterosexual biological males. This part of the brain is known as the "Interstitial nucleus of the Anterior Hypothalamus (1-4)" Four different nuclei that were different in homosexual males and heterosexual males. It is also reasonable to assume that their is no direct connection between this and gender identity. **The first things I have to do is construct the Hilbert Spaces of these two systems** After that I will combine them using the tensor product formalism.

First on the INAH (1-4) The system will have two [pure states](). The state of being totally, perfectly, androphilic. Represented by the [ket]() |A>. As well as the state of being totally gynephilic which will be represented by the ket |G>. The state of a persons actual sexual orientation will be what is called a [mixed state](). It will be represented by

|S>. $|S> = H|A> + (1-H)|G>$

Where $0 < H < 1$

H will represent the strength of the effect that causes the difference in the INAH(1-4) what ever the heck it is, we don't know and all kinds of complex, social and biological systems are being [traced]() over to determine that number. I know it sounds like a stretch but physicist do it all the time and still get reasonable results. To formally describe a Hilbert space there has to be an identity element (usually denoted with a 0). The zero element would be, theoretically someone who is just not attracted to anyone. I will represent this with |0_S>. Which mathematically would be the case when someone is effected, by something, that could cause homosexuality, and something else that would cause them to be heterosexual. It could be social, or biological or some combination there of.

$|0\_S> = |A> - |G>$

So this is the set of vectors in this Hilbert space

$\{|A>, |H>, |0\_S>, |S> = H|A> + (1-H)|G>\}$

With the addition, defined as I have this kind of vector space this is called a [Convex]() [vector space](). To formally make this a Hilbert space there has to be a definition of what is called the [inner product](). This one will just be simple polynomial multiplication (recall from school $(aX+c)(bX+c) = abX^2 + aXc + cbX + c^2$) for the sake of not making things more complex (introducing calculus and such, would be overkill

at this point.) like wise.

$$\langle S1|S2\rangle = (\langle A|H1 + \langle G|(1-H1))(H2|A\rangle + (1-H2)|G\rangle)$$

$$= \langle A|H1\ H2|A\rangle + \langle A|H1(1-H2)|G\rangle + \langle G|(1-H1)H2|A\rangle + \langle G|(1-H1)(1-H2)|G\rangle$$

$$= H1H2\langle A|A\rangle + (H1-H2H1)\langle A|G\rangle + (H2-H1H2)\langle G|A\rangle + (1-H2-H1+H1H2)\langle G|G\rangle$$

By definition of a pure state |A> and |G> are orthonormal. This means

$$\langle A|A\rangle = \langle G|G\rangle = 1 \quad \langle A|G\rangle = \langle G|A\rangle = 0.$$

This simplifies the last line of math by allot.

$$= H1H2\langle A|A\rangle + (1-H2-H1+H1H2)\langle G|G\rangle$$

So this is a well defined Hilbert space for this physical-psycho-neurological system.

Bissexuals are there as well, for them H=1/2 or there about.

Now to do likewise for transsexalism and the BSTc

There will also be two pure state. Transsexual |T>, or not transsexual |N>. The general state of most people will as before be a mixed state |F>. With a identity state that will represent those people who feel as if they have no definite gender, not bigendered, but just totally agendered. There are people who say that's how they feel. |0_F>

$$|F\rangle = B|T\rangle + (1-B)|N\rangle. \quad 0 \leqslant B \leqslant 1$$

All together the set of states in the space of gender identities is in this Hilbert space.

$\{|T\rangle,|N\rangle,|0\_F\rangle,|F\rangle=B|T\rangle+(1-B)|N\rangle\}$

With the inner product the same as that which I defined for the INAH(1-4).

As far as describing the variety of transsexual people in the world this second Hilbert space is sufficient. The strength of the effect which I denoted with B varies from people who are not at all transsexual to those who are totally inverted and everything in between. It includes those who are bigendered (B=1/2) and those who are agendered.

That does not mean that the sexual orientation of a given transsexual or transsexuals could not have an influence on their development. Consider this simple diagram .
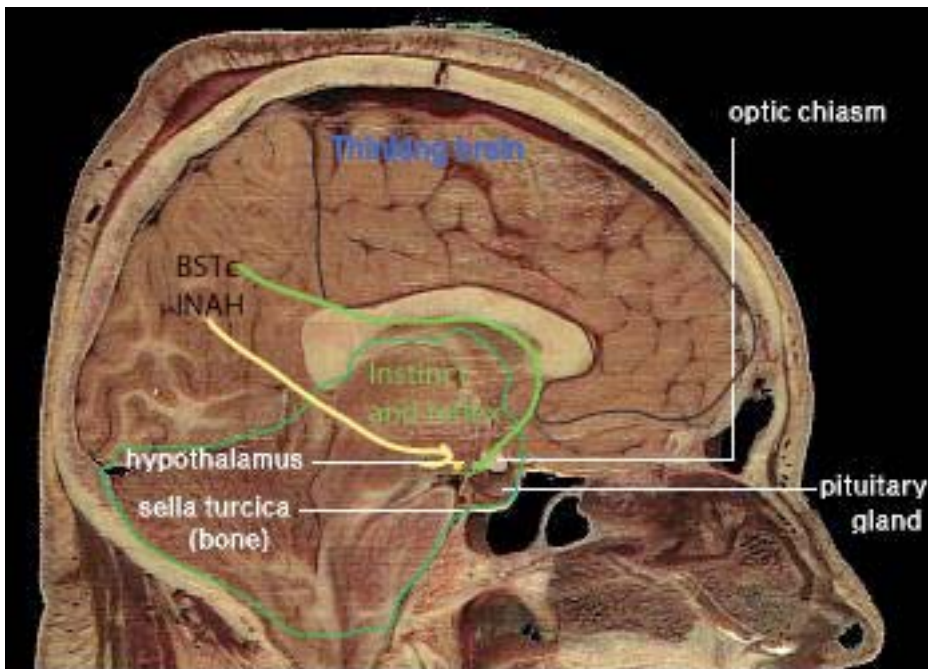
Within the large part of our brains that is devoted to instincts, reflexes, and autonomic responses there sits the hypothalamus. A pretty small

area. The highlighted area's are highlighted to show the area's where the INAH(1-4) and the BSTC lie respectively. Within less than and inch of each other. Like all the neurons in the brain the ones in there even though they may not be directly connected. For the state of one to be entangled with the state of the other they need not be so connected. That is not how entanglement works exactly (for example once one electron has been entangled with another, even if you move them across the universe from each other, even if you "adiabatically" separate them they will remain entangled ever after. This phenomena has allowed physicist to teleport small amounts of matter. It is an observed physical fact.)

Based on that observation I would expect that sexual orientation and gender identity could be rather strongly entangled.

Now to show it mathematically by compositing the Hilbert spaces.

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==>
{|A>,G>,|0_S>,|S>=H|A>+(1-H)|G>}⊗{|T>,|N>,|0_F >,|F>=B|T>+(1-B)|N>}

==> That the composite Hilbert space will have the following vectors.

{|A>⊗|T>,|A>⊗|N>,|A>⊗|0_F>,|A>⊗|F>,
|G>⊗|T>,|G>⊗|N>,|G>⊗|0_F>,|G>⊗|F>,
|0_S>⊗|T>,|0_S>⊗|N>,|0_S>⊗|0_F>,|0_S>⊗|F>,
|S>⊗|T>,|S>⊗|N>,|S>⊗|0_F>,|S>⊗|F>}

The question is are any of these states entangled? From the definition of quantum entanglement.

Consider two [noninteracting systems A and B, with respective

Hilbert spaces H_A and H_B. The Hilbert space of the composite system is the tensor product

 H_A⊗H_B

If the first system is in state |ψ_A> and the second in state |φ_B>, the state of the composite system is

 |ψ_A>⊗|φ_B>,

which is often also written as

 |ψ_A>φ_B>.

States of the composite system which can be represented in this form are called <u>separable states</u>, or product states.

Not all states are product states. Fix a basis \{|i_A>} for H_A and a basis \{|j_B>} for H_B. The most general state in H_A⊗H_B is of the form

 ∑{i,j} c_{ij} |i_A>⊗|j_B>.

If a state is not separable, it is called an entangled state.

OK so are any states in INAH⊗BSTc unseparable?

The tensor products of the pure states are probably separable. How about the mixed states?

|S>⊗|F>
=(H|A>+(1-H)|G>)⊗(B|T>+(1-B)|N>)
=H|A>⊗B|T>+H|A>⊗(1-B)|N>+(1-H)|G>⊗B|T>
+(1-H)|G >⊗(1-B)|N>

$$=HB|A>\otimes|T>+H(1-B)|A>\otimes|N>+(1-H)B|G>\otimes|T>$$
$$+(1-H)(1-B)|G>\otimes|N>$$

Which is an unseparable state, therefore an entangled state. *Therefore I have shown that based on the axioms of quantum theory and mathematics that gender identity is entangled with sexual orientation.*

Quod et Demonstratum

I also did not choose a specific representation for these vectors (whats called a basis, like coordinates, or functions) that part was left totally abstract and general. Therefore I can say that this entanglement is a fundamental feature of the system and not an artifact of picking a specific basis.

The mixed states which are entangled are the most general states of mind that can be. The pure states should be thought of as idealizations that are only used to write the mixed states. Surely there are people who are very , very close to one of the pure states, hardly anyone is 100% anything in real life.

The point of all of this?

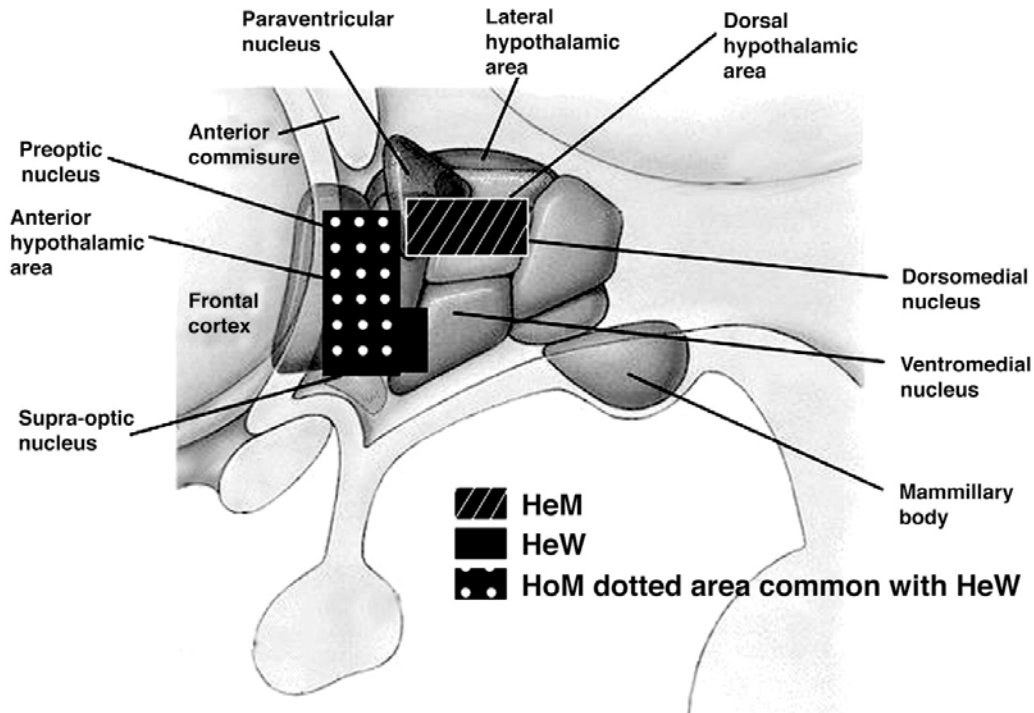In case you missed it because it was stated in mathematical terms…

What I have shown *mathematically, and physically* is that the sexual orientation of a person and their gender identity MUST be entangled if these states of mind are controlled by the brain in the way that most transsexuals think they are.

For this to be disproved one would have to disprove quantum mechanics.

A final comment on this from me. If the INAH and BSTc are shown to be the area's that control sexual orientation and gender identity it will be a mixed bag for the "transgendered" community. On the one hand transsexuals will be validated as really in a limited but physical sense having a female brain. While at the same time it will have been shown that sexual orientation is controlled by a totally different portion of the brain, yet still every bit as physical and "hard wired" as gender identity is supposed to be. *What would that mean for the scores of transsexual women who say that their sexual orientation changed due to hormones?* What would this mean for the BBL controversy? Should there have even been a controversy? For the opponents of BBL theory believe strongly in the notion of "brain sex", while the supporters of it believe strongly in the notion of "brain sexual orientation". Perhaps they should have taken a deeper, more physical look at what they were talking about? (But hey the lead characters were a psych*ologist* and a "computer scientist" *. Both smart people but everyone knows the best, most hard core scientist go into theoretical physics. ;)) **The truth of the matter is that both sides are half right and half wrong.**

Furthermore the large area that I denoted the "thinking" brain can modify things a bit. i.e. I can make someone abstain from sex or alternative gender expression for sociological reasons (religion etc.) It can't really change what lies beneath.

Examine this diagram from a study done on gay males, straight males, and straight women (btw lesbians were in a similar study but the results were null.)

Paraventricular
nucleus

Lateral
hypothalamic
area

Dorsal
hypothalamic
area

Preoptic
nucleus

Anterior
commisure

Anterior
hypothalamic
area

Frontal
cortex

Dorsomedial
nucleus

Ventromedial
nucleus

Supra-optic
nucleus

Mammillary
body

HeM

HeW

HoM dotted area common with HeW

Observe that the general location of the INAH is in the area that responded to male pheromones just as the heterosexual women did. Also notice the proximity of these regions.

As a casual observer I would expect there to be more than simple entanglement or correlation of some personality traits due to gender identity and gender identity, but perhaps even basic almost instinctive differences in behavior. A direct connection between being a transsexual with a given sexual orientation and a set of behaviors. This paragraph is just my one speculations

* I had met Dr. Bailey a few years prior to the publication of his book "The Man Who Would be Queen" and at about the same time I became aware of Lynn Conway and her remarkable life. I will admit that both of them have in their own ways influenced me in great and positive ways.