Twitter Thread by polar, but ■ depressed ■

polar, but ■ depressed ■
@p01arst0rm

So I just watched @Polygon 's new video on using videogames and VR as a form of therapy, but this scene in particular seemed a bit off.

specifically, what got me thinking was this bit

As someone who has been diagnosed with ADHD and ASD, these kinds of backhand comments about "treating" me are things I've had to put up with all my life.

But this time, instead of dismissing it out of hand, I started to think. This sounded kind of suspicious. There's no way that scientists could possibly think that creating a ~VR classroom~ is a suitable method for treating children with ADHD/ASD?

Was that even a thing? Well, I wasn't sure. So I set to finding out.

So it turns out the guy in this polygon clip is called Dr. Albert 'Skip' Rizzo, which is objectively a slam dunk name.

He is a neuropsychologist for the University of Southern California, and has done quite a bit of stuff on this kind of VR based exposure therapy.

The first thing I looked for was obviously a google scholar search with the key words "Rizzo", "ADHD", "exposure therapy", and "VR". And wouldn't you believe it, I struck up on the journal just like that.

So long story short these researchers created a video game school classroom and got a collection of ADHD kids and then a collection of "control" kids and then had them perform tasks under examination.

They then used the results of these tests to correlate whether the tests could accurately predict an ADHD diagnosis.

The first thing that struck me as questionable from this journal was the fact their sample size was NINETEEN PEOPLE. Excuse me? You seriously expect me to believe that NINETEEN is statistically impactful?

wtf kind of sample size is that? Granted, this is a fancy new preliminary method

but STILL

the second thing i noticed was them repeating the very common claim that "ADHD is more common in males than females", which is mostly baseless

I believe this to just be outdated information. While it is true that ADHD is more commonly DIAGNOSED in males than females, It is now thought that ADHD does not have an explicit gender bias

Personally I believe it makes zero sense for there to be one at all. It is far more likely that societal factors, and the way symptoms present in different people, affect the diagnosis rates between genders.

here is a survey i found that interviewed 1797 adults (541 of which were parents of children with ADHD).

It concluded that "gender has important implications in the diagnosis and treatment of ADHD", finding that four out of ten teachers reported more difficulty diagnosing ADHD in girls.

57% of people included in the survey think that ADHD is left undiagnosed in girls, and it was also noted that girls put on ADHD medication were three times more likely to have been put on an antidepressant prior to their ADHD medication.

Now, this subject obviously needs more research and you could literally write a book on how the expression of ADHD is effected by societal factors. But, i feel it poignant to highlight that this journal entry is pulling stuff out of its arse on the first fucking page.

The next point of contention is found in the next paragraph. They journal stats that "the ability of CPT tests to make predictions about individual diagnosis is limited". Yep.

It then moves on, stating that those with ADHD make more errors of omission & commission, and "have poorer on overall index scores". Right.

It then jumps back a few paragraphs choosing to repeat itself for no reason. The journal then reads:

```
As indicated, the predictive diagnostic utility of CPT tests in differentiating children with ADHD and those without is limited, given the large overlap in performance between the two groups.
```

[cont]
```
In other words, these tests are poor in differentiating between children with ADHD and healthy controls. [This is] because setting the cutoff stringently enough to capture children with ADHD, results in incorrect classification of normal children as impaired.
```

also, side note. journal editors. what the fuck is up with you skipping out punctuation, and writing leading sentences.

It is not uncommon for people with ADHD to struggle with reading prose when sentence structure is confusing, exhaustive or just objectively difficult to read (weird typefacing, font, etc).

I just find it beautifully respective of the problem. The fact that your journal entry about ADHD is not friendly to ADHD readers.

Put a pin in that.

The next section gets really messy in structure so i've cleaned it up a little. If you don't trust my editing, you can look up the journal yourself; in fact, i encourage you to do that anyway.

```
Grodzinsky and Barkley (1999) found, for example, that for boys, the CPT scores of “number correct” and “number of commissions” had a 'positive predictive power'* of over 80%; however, these scores had only 'moderate negative predictive power'**
```

[cont]

```
The authors suggest that while “abnormal scores on the CPT may indicate relatively high probability for the diagnosis of ADHD, nearly 60% of the ADHD children received normal scores on this test”
```

[cont]

*the chance that a child with an abnormal score has ADHD

**the chance that a child with a normal score did not have ADHD

---

so this bit is a bit of a rollercoaster. The results of the CPT test state that when they try to differentiate between the ADHD set and the control, the CPT fails sixty percent of the time.

WHAT.

SIXTY.

HOW TF IS YOUR ADHD TEST FAILING TO DIAGNOSE SIXTY FUCKING PERCENT OF DIAGNOSED PEOPLE TESTED. YOU LITERALLY HAVE A BETTER CHANCE OF A CORRECT DIAGNOSIS BY FLIPPING A COIN.

but have no fear! The journal writers have an explanation for this. They state that the bad results are likely down to the "atypical conditions" under which the CPTs are usually administered.

It then goes on to state that the "correlations between parent and teacher ratings of child behavior and CPT scores tend to be weak".

Now im no expert, but it seems to me that this CPT might just be super subjective and very sensitive to the environment it was carried out in. One may say that issues with ADHD were linked to environmental factors.

o n e m i g h t s a y A D H D
i s s o m e w h a t
e n v i r o n m e n t a l

But nope, they completely wanted curve that bullet and state that it raises "questions about the validity of standard CPT tests" Y'all were SO CLOSE.

The journal then goes back into theorising . A better way to increase the specificity of the CPT would be to increase the amount of distractions present while the student is performing the test.

it explains this is because ADHD diagnosed people are known to be less capable of dealing with distractions.

They state they could also use the fact that ADHD diags are better at engaging with "novel" information to test for symptoms of ADHD (presumably if they retain novel information better than the control they have ADHD traits).

They then take note that the properties of the stimulus should be taken into effect because they likely effect how ADHD diags will respond (is it novel? Is it connected to immediate events? Is it something they're interested in? etc etc).

The problem is they can’t account for these factors because there hasn't been any significant studies looking into the effects of these kinds of things on ADHD, and the available information is conflicting.

And then we are introduced to the premise of this journal.

```
While it has been difficult to present ecological distracters in a controlled manner in the past, advances in virtual reality technology now make it possible to do so.
```

[cont]
```
Virtual reality can be seen as “an advanced form of human-computer interface which allows the user to ‘interact’ with and become ‘immersed’ in a computer-generated environment in a naturalistic fashion”
```

[cont]
```
Virtual reality technology can be used to aid in the assessment and rehabilitation of cognitive abilities.
```

[cont]
```
Virtual reality offers several benefits when combined with traditional neuropsychological assessment measures, including that it involves more realistic, lifelike environments that may allow persons to “forget” that...
```

[cont]
```
...they are being assessed, the control of stimulus presentation, the safe assessment of hazardous situations, increased standardization of rehabilitation protocols, increased user...
```

[cont]
```
...participation, and increased generalization of learning (Schultheis & Rizzo, 2001).
```
[THAT'S A SINGLE SENTENCE ARE YOU KIDDING ME?]

[cont]
```
For example, virtual reality can aid in rehabilitation by allowing people to practice cognitive abilities in a simulated environment that is similar to the ones in which they will use these abilities (Rizzo et al., 2000).
```

[cont]
```
VR has been used with adults in many domains of psychological assessment and intervention, including exposure therapy for anxiety disorders such as 'fear of flying'*, 'fear of heights'**, and 'various other phobias'***.
```

[cont]

* (Rothbaum, Hodges, Anderson, Price, & Smith, 2002; Rothbaum et al., 2006; Rothbaum, Hodges, Smith, Lee, & Price, 2000)
** (Emmelkamp et al., 2002; Rothbaum et al.,1995)

[cont]

*** (Anderson, Rothbaum, & Hodges, 2003; Botella et al., 1998; Carlin, Hoffman, & Weghorst, 1997; Garcia-Palacios, Hoffman, Carlin, Furness, & Botella, 2002; Parsons & Rizzo, in press; Powers & Emmelkamp, in press).

It then goes on to highlight this kind of therapy has been successful with things like brain injuries, strokes, motor impairments, and some neurological disorders.

They achieved these results by crafting a special VR world for a patient. They then used this world to slowly expose the stimulus their treatment called for

e.g. 'fear of heights' they would build a world of skyscrapers, 'fear of flying' they would build airplanes, and so on.

They go on to say that they can use this VR technology to create a more controllable environment to help make their pesky CPT test more reliable. You know, the one that doesn't seem to be working.

Remember when they stated earlier that it would be real nice to be able to control and introduce distractions to make it easier to diagnose ADHD?

Well gosh darn this fancy simulator lets them control that!

Now here's the juicy bit

```
Rizzo et al. (2006) conducted a clinical pilot study utilizing the Virtual Classroom in a head-mounted display with 8 boys with ADHD and 10 controls ranging in age from 6 to 12 years.
```

[cont]
```
They compared the groups in the distracting condition and in a “non-distraction” condition where sound had been turned off and people and objects did not move.
```

[cont]
```
The ADHD group performed significantly worse than the control group in both non-distracter and distracter conditions, committing more omission and commission errors and producing more variable reaction times in both.
```

So in short, this method managed to indicate that people with ADHD have ADHD. Pretty cool.

This is then followed up with data on a similar test performed on a different sample.

And then we get the money shot.

```
The present study was an initial attempt to investigate the ability of the Virtual Classroom to discriminate between an ADHD* and control group, compared to a standard vigilance test (Vigil).
```

[cont]
```
The Behavior Assessment System for Children (BASC) Monitor for ADHD, a parent rating scale, was also administered in order to provide confirmation of differences between the two groups of children and...
```

[cont]
```
to examine the relationship between this rating scale and performance on the two different CPT presentations (Virtual Classroom versus Vigil).
```
* [Holy shit referring to people as ‘an ADHD’ WHAT THE FUCK DUDE]

The rest of the paper is mostly just about the tests themselves, methods and results, the like. But reading through i found another little quote that shows the writers of this journal actually know about ADHD:

```
Another limitation of this study was that approximately half of the ADHD sample had taken their medication in the morning, while the other half had not.
```

[cont]
```
Although no differences between those on versus those off medication were observed in performance in this study, it is conceivable that larger effects would have been observed...
```

[cont]
```
had none of the children been on medication.
Future studies should attempt to control more carefully for medication effects
```

This is a good point in general, but it shows complete a lack of understanding on subject of ADHD medication.

To put it simply, a lot of ADHD drugs are not like paracetamol; you cant just take one, feel the positive effects for a while, then feel them wear off.

A large amount of ADHD drugs instead build up inside of you over the process of months, if not years, and alter your state of mind on a base level.

Not taking your medication for a single day isn't exactly good, but for many drugs it will make little to no difference, as withdrawal doesn't start kicking in for a good while after you stop taking them.

This isn't really a big thing, but it's another note showing that the writers of this journal either didn't do their homework, or just didn't care to take these things into account.

It does bring up that you should take the findings with a grain of salt because of the piss weak sample sizes though. So yea, do that

Now. You may have noticed something. This entire paper was about diagnosing ADHD in male children.

BUT HANG ON A SECOND. DIDN'T THAT POLYGON SPLASH SAY THAT HE WAS USING THIS TECHNOLOGY TO TREAT ADHD??!?!?!?!?!

And there it is. My BS alarm was right.

This was the only published thing related to ADHD, VR, and exposure therapy that I could find.

There is currently no public research showing that VR technology has been used for "treating" ADHD.

"well whats the difference??" well it doesnt really matter, but people should be aware that language referencing "treating" neurodiversity is often... how you say.. problematic

neurodiversity is not an "illness" you need to "treat". its really kind of yikes and has eugenics vibes

So now I'm gunna comment on this journal a little. As i said before, I am in fact diagnosed with ADHD and Autism.

And there's some very obvious sleight of hand being done with a lot of ADHD research that I'd like to go into, from my perspective.

ADHD (formally just ADD) stands for Attention Defecit Hyperactivity Disorder.

It is not a disorder of personality. We do not ~choose~ to be this way. It is simply down to the way our bodies work.

When you... "suffer" from ADHD you will notice a few differences in the way you experience life compared to neurotypicals.

The most common and obvious differences are in:
- attentiveness (ability to focus)
- mobility (ability to control your body)
- attention (ability to process information).

Now. You may be wondering why ADHD is classed as a "learning disability".

I have, for a long time, stated that it is my personal belief this is not at all true.

in my experience, ADHD is no more a learning disability than vision impairment, being Hard of Hearing, Physical disability, etc.

ADHD is in fact, not a learning disability. It's just the affects of ADHD are most obviously noticeable in a school environment.

Let me tell you about my experience in a school classroom with ADHD.

Students were crammed together into small classrooms with barely enough room to move.

The class is lectured by a single teacher that's always out of earshot.

Printouts are given to students in small print font with little thought into its layout.

Students rarely work in silence, often talking, there's analogue clocks on the walls ticking away, computer towers whirring, uncomfortable chairs, uncomfortable ratty uniforms that you are required to wear, and zero climate control.

Lets compare that with our "ADHD symptoms" shortlist.

To make a long story short, when you have ADHD, everything about you is far too sensitive.

Things that seem perfectly tolerable to others are unbearable;

Normal room lighting can be too bright, a slightly warm room can be unbearably hot.

An uncomfortable chair will make your entire body hate you, small peaks in background noise can become piercing.

The average school classroom is an onslaught of excess sensory information that you need to process and it is exhausting.

A single uncomfortable classroom can wipe out your energy for an entire day.

Imagine being an introvert, but like, REALLY being an introvert.

You can’t turn off this sensory information, you can’t tune it out; it’s just there. Constantly.

The easiest way to help a person with ADHD focus on their work is to remove these uncomfortable distractions. Fix your buildings climate control, or if you don’t have any, install a system. Buy chairs for students that are comfortable and supportive.

Print out worksheets with neurodiverse people in mind. Use larger fonts. Allow students to choose the colour of the paper they're printed on (common alternate colours include pink, blue, and yellow).

Separate large sections of prose up with line spacings, or split them into smaller, more manageable paragraphs. These step also has the handy effect of greatly helping out students with dyslexia too!!

You could also decrease classroom sizes.

This would allow students to sit closer to teachers, making processing their lectures a lot easier (because now you can actually hear them!!).

It also decreases the amount of background noise from the chatter of other students.

Give your students space to stretch their arms and legs, instead of forcing them to sit in a single position for hours on end.

Allow students to leave their seats after extended periods of time (say an half an hour or so) to let them stretch their muscles out.

All these steps are very simple methods to decrease sensory input in a classroom.

Now, obviously, i have no *proof* these steps would help all people with ADHD; I can only opine on what works for me.

I'd be super interested to see this sort of stuff researched though.

And this really highlights the problems of ADHD discourse.

Everyones too busy trying to "treat" people with ADHD they never stopped to think about what causes it

what factors may be positively or negatively impact someone with ADHD

what they personally find comfortable or helpful, how to better diagnose it.

Even though at some points this journal is a bit yikes, Rizzo here is doing it right.

The last thing I have to say. There’s this culture in academia that people with ADHD are "wrong" and "need treating" and it just fucking disgusts me.

Maybe your ADHD research would be a lot more successful if you included ADHD people in your research process, instead of treating them like lab rats.