Table 1

Attributes of ADHD and Scientific Limitations Impairing the Reliability and Validity of the Diagnosis

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|  | **Attributes of ADHD and Scientific Limitations** | **Reliability** | **Test Validity** | **Internal Validity** | **Ecological validity** |
| **Section 2: The Criterion of Deviance** | | | | | |
|  | ADHD is not an unusual phenomenon. |  | √ |  |  |
|  | Gaps in the diagnosis rates associated with multiple socio-demographic parameters (socioeconomic status, age, gender). | √ |  |  |  |
|  | High rates of incorrect diagnosis and over-diagnosis (false positives). | √ |  |  |  |
|  | Claims of missed diagnosis (false negatives). | √ |  |  |  |
| **Section 3: The Criterion of Danger** | | | | | |
|  | The criterion of danger does not appear in the list of symptoms. |  | √ |  |  |
|  | ADHD in childhood does not pose a clear danger to the child (partly due to negligible baseline rates of dangers). |  | √ |  |  |
| **Section 4: The Criterion of Distress** | | | | | |
|  | The criterion of distress does not appear in the list of symptoms. |  | √ |  |  |
|  | ADHD cannot be methodologically separated from the educational environment; therefore, the hypothesis that the school setting causes distress (especially among energetic or dreamy children) cannot be disproven. |  |  | √ |  |
| **Section 5: The Criterion of Dysfunction** | | | | | |
|  | Brain differences shown via neuroimaging disappear with age and in predicting the continuous measure of symptom severity | √ |  |  |  |
|  | The degree of variance explained by differences in the binary index (ADHD yes / no) is negligible. |  |  | √ |  |
|  | Many researchers who find brain differences have a conflict of interest (e.g., Hoogman et al., 2017) |  |  | √ |  |
|  | Findings from neuroimaging studies do not converge onto agreed-upon areas of the brain. | √ |  |  |  |
|  | Computerized tests administered before and after taking Ritalin do not represent realistic life situations outside the laboratory. |  |  |  | √ |
|  | These computerized tests are based on the paradoxical effect, an assumption that has been disproven both logically and empirically. |  |  | √ |  |
|  | The entire list of symptoms of ADHD is based on the single criterion of dysfunction. |  | √ |  |  |
|  | The dysfunction criterion has been softened over time to “reduced function”. | √ |  |  |  |
|  | Partial dysfunction (reduction of function) is not a satisfactory criterion for diagnosis because all people have strengths and weaknesses (neurodiversity). |  | √ |  |  |
|  | Symptom assessment is based on unclear definitions (such as the word ‘often’) and reliability problems among various assessors, such as parents and teachers. | √ |  |  |  |
|  | There is significant overlap between the symptoms of the disorder. | √ |  |  |  |
|  | Some presentations of ADHD do not share a single common symptom. |  | √ |  |  |
|  | Symptoms disappear during vacations and other situations unrelated to school (for example when reading a book or visiting the clinician's office). | √ |  |  |  |
| **Section 6: Extreme Cases** | | | | | |
|  | Extreme cases, in which there is deviance, distress, and dysfunction unrelated to the school setting, are not reflected in the diagnostic criteria for ADHD, and are present in the criteria for other disorders. |  | √ |  |  |
|  | The differential diagnostic task is difficult in view of numerous disorders that may seem like ADHD (at least 16 according to the *DSM*). |  | √ |  |  |
|  | 70% of extreme cases of ADHD are associated with comorbidities. |  | √ |  |  |
|  | ADHD does not have the negative stigma associated with other mental disorders. |  | √ |  |  |
| **Section 7: Treatment with Psychotropic Drugs** | | | | | |
|  | Research on drug treatment has a commercial bias and many researchers have financial connections to pharmaceutical companies. | √ |  | √ |  |
|  | The effectiveness of treatment with psychotropic drugs is limited, while potentially causing distress and danger. |  | √ |  |  |
|  | There is a lack of randomized controlled trials on the positive and negative effects of long-term treatment with psychotropic drugs. |  |  | √ |  |
|  | The consumer medicine information leaflet for Ritalin is worded so as to minimize (and perhaps hide) the severity and frequency of the drug’s side effects. |  |  | √ |  |
| **Section 8: Overview** | | | | | |
|  | Lack of scientific parsimony leads to instability of the theoretical structure. |  | √ |  |  |

Explanation of the table

**Reliability** refers to the ability to measure variables accurately and consistently with as few errors as possible. The reliability column includes the various coefficients of reliability: stability over time, equivalence between different means of evaluation, equivalence between assessors, and internal traceability. Reliability is a prerequisite for validity of the variable (see below) and for the research findings and conclusions that are based on the same assessment. That is, when there is a problem of reliability in assessing a variable, then there is necessarily also a problem with the validity of the scientific findings and / or the conclusions drawn from them (Holt et al., 2012).

**Validity** refers to the extent to which the variable itself (e.g., ADHD), the means of assessing its existence and intensity (observations and measurement tools), the findings obtained and conclusions drawn from research conducted on this variable are based on solid scientific foundations and correspond with reality (Brewer & Crano, 2000).

In the arena of measurement, validity refers to the extent to which an observational tool (e.g., Connors Questionnaire) accurately measures the theoretical variable it is intended to measure (e.g. ADHD). There are several types of measurement validity (for example, predictive validity and content validity). The information in this table primarily refers to **construct validity**, although it is also applied to topics not directly related to measurement. Construct validity refers to the degree to which there is a fit between the observed variable and the theoretical construct of that variable (Cronbach & Meehl, 1955). Construct validity in specific includes two types of validity known as discernible validity and convergent validity. These essentially relate the fictional request of the *Little Prince* for the adult to draw a sheep with ADHD, which contains only the components of one theoretical variable, without including components from other theoretical variables.

In the field of empirical research, **internal validity** refers to the extent to which conclusions can be drawn about relationships (particularly causal relationships) between the various factors, based on the measurement tools, sample, and research set (Brewer & Crano, 2000). To enable researchers to infer causality and refute the existence of spurious and interfering relationships, it is recommended they conduct randomized control trials (RCTs), which are approached in an objective manner and with as few conflicts of interest as possible. **Ecological validity** refers to the extent to which research results are relevant to real-life situations, outside the research framework. This type of validity is important to allow for generalization of the research results to other populations, settings, situations, and times (Mitchell & Jolley, 2012).