



# The Hamburg–Hannover Agitation Scale (H<sub>2</sub>A): Development and validation of a self-assessment tool for symptoms of agitation



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## ABSTRACT

**Background:** Agitation has long been underestimated as a symptom occurring across psychiatric disorders. While several instruments exist for highly specific clinical target groups (e.g. dementia, traumatic brain injury), no tool captures agitation in a broader range of psychiatric patients. The Hamburg–Hannover Agitation Scale (H<sub>2</sub>A) has been designed to satisfy this demand. This study concentrated on the development and validation of the scale in a psychiatric and a healthy control sample.

**Methods:** The H<sub>2</sub>A was developed, tested in an expert sample, and revised. The German version was validated in a study involving two clinical institutions. Patients (n = 180) completed the H<sub>2</sub>A and several other questionnaires in order to test for congruent and discriminant validity. Healthy subjects (n = 685) completed the H<sub>2</sub>A only. The H<sub>2</sub>A was translated into English.

**Results:** The H<sub>2</sub>A showed very satisfying quality criteria (reliability, selectivity, item difficulty) and regression analysis demonstrated the H<sub>2</sub>A's ability to distinguish between subjects with a psychiatric diagnosis and healthy subjects with or without psychiatric record. Factor analysis revealed a three-factorial structure representing a physiological/somatic, a mental and a mixed ('psychophysiological') dimension of agitation.

**Limitations:** Although validation showed promising quality criteria and predictive value of the H<sub>2</sub>A, calibration tests with bigger and more balanced sample sizes are necessary.

**Conclusions:** Agitation has become more clinically relevant as a symptom occurring in various affective disorders, yet its assessment is limited. The H<sub>2</sub>A was developed in order to meet this need. Validation of the H<sub>2</sub>A revealed very satisfactory item and scale quality criteria promoting its utility.

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*"Their swaying bodies reflected the agitation of their minds,  
and they suffered the most agony of all,  
ever just within the reach of safety or just on the point of  
destruction."*

Thucydides

## 1. Introduction

Agitation is currently seen as a state of mental and/or physiological restlessness that still lacks a consensual expert definition (Cummings et al., 2015; Marder, 2006). Agitation has previously been described as "a state of motor restlessness accompanied by mental tension. [...] Acutely agitated patients usually have major psychiatric or medical illnesses that are driving the agitation." (Battaglia, 2005). Other definitions describe agitation as "a state of poorly organized and aimless psychomotor activity stemming from physical or mental unease" (Lindenmayer, 2000) or as a diffuse increase in body movement, usually expressed as fidgeting, rapid and rhythmic leg or hand tapping, and jerky start-and-stop movements of the entire body, accompanied by inner tension; agitation is often accompanied by pacing and hand wringing" (Kaplan and Sadock, 1995). The DSM-V (American Psychiatric

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Association, 2013) defines psychomotor agitation as “Excessive motor activity associated with a feeling of inner tension. The activity is usually nonproductive and repetitious and consists of behaviours such as pacing, fidgeting, wringing of the hands, pulling of clothes, and inability to sit still”. Moreover, states of agitation can occur with or without aggression (Cummings et al., 2015).

Agitation presents itself as a symptom or syndrome rather than a diagnostic term (Cohen-Mansfield et al., 1990; Cummings et al., 2015) and is common among psychiatric patients (Alderfer and Allen, 2003). Although it can be found even without concomitant psychopathology (Cummings et al., 2015), agitation predominantly appears in a variety of psychiatric disorders including affective disorders like (bipolar/mixed) depression, personality disorders (e.g. Borderline personality disorder; BPD), anxiety disorders like panic disorder (Kasper et al., 2013; Marder, 2006; Swann, 2013) or psychoses including schizophrenia (Gonzalez et al., 2013; Rothenhäusler and Täschner, 2013). The DSM-V (American Psychiatric Association, 2013) ascribes agitation as a specifier and/or symptom to neurocognitive disorders, depressive disorders (MDD and bipolar disorder), medication-induced movement disorders, substance-related disorders and psychotic disorders. Overall prevalence rates are 11–13% for schizophrenia or mood disorders and go up to even 24% for BPD (Pascual et al., 2006) and 20–30% for anxiety disorders (Pacciardi et al., 2013). A recent study by Sani et al. (2014a) showed even higher numbers for depression. “Psychic agitation” was observed in 42% and “absence of retardation” in 53.5% of the MDD patient sample. These recent findings go in hand with psychomotor theories on depression that expects disturbances in psychomotor activity to be basic features of depression (Sobin and Sackheim, 1997).

Agitation is potentially involved in almost 50% of all psychiatric emergency visits in the USA (Allen and Currier, 2004), which equals 1.7 million potentially agitated patients in a total number of at least 3.4 million emergency visits annually. Despite its manifestation in various mental illnesses, agitation has been poorly addressed in scientific publications (Lindenmayer, 2000). This „lack of attention “towards agitation might be due to conflicting and imprecise definitions (Mintzer, 2006; Rhebergen and Sinaert, 2015) and the lack of well defined specific endpoints (Pacciardi et al., 2013). However this deficiency is important to be changed (Sachs, 2006), especially since agitated patients are difficult to treat (Alderfer and Allen, 2003) and their agitation seems to be a potential reason for compulsory hospitalisation (Kasper et al., 2013). Moreover, agitation has been found to predict suicide, suicidal ideation and suicide attempts (Balázs et al., 2006; Bryan et al., 2008, 2014; Fawcett et al., 1990; Ribeiro et al., 2014) and several works have pointed out the consequential importance of careful diagnosis (Bryan et al., 2014; Nishiyama and Matsumoto, 2013; Ribeiro et al., 2014) and appropriate treatment (Nishiyama and Matsumoto, 2013; Ribeiro et al., 2014; Sani et al., 2014b). Hence, agitation represents an important therapeutic target (Marder, 2006; Pacciardi et al., 2013). Lately, it has been studied as a specific treatment target in schizophrenia (Lessem et al., 2011), bipolar disorder (Fishman et al., 2009) and agitated depression (Nishiyama and Matsumoto, 2013). Applied efficacy outcome measures include instruments that are complex and take time to administer, thus possibly overstraining and burdening the patient that already is in a “marked malaise” (Pascual et al., 2006). A current case series focussing on agitation as a specific treatment target in BPD (Kahl et al., 2015, in revision) used an early version of the here presented Hamburg–Hannover Agitation Scale and observed easy administration and very satisfying sensitivity to change. Other recent scientific work focusses on the predictive value of psychomotor symptoms (retardation and agitation) and criticizes once more the “lack of a uniform method of assessing

psychomotor symptoms” as these seem to hold a strong prognostic value for treatment of depression with noradrenaline or dopamine-enhancing antidepressants (Rhebergen and Sinaert, 2015). An improvement of the assessment of agitation has the potential to result in a better choice of therapeutic interventions (Buyukdura et al., 2011; Sobin and Sackheim, 1997) and thus facilitating individualized treatment approaches (Rhebergen and Sinaert, 2015).

Recently, psychomotor agitation, as measured by the respective item of the Hamilton Depression Scale (item 9), was identified as a potential predictor of response of depressive symptoms to glabellar injection of botulinum toxin (Wollmer et al., 2014). In this context, the lack of an appropriate instrument to measure agitation was experienced once more. While several tools exist for measuring agitation in specific situations and conditions, no sufficient instrument could be found regarding agitation as a symptom across various disorders.

The recently developed and here presented Hamburg–Hannover Agitation Scale (H<sub>2</sub>A) has the opportunity to fill a void in the landscape of diagnostic instruments. While the first part of this report covers initial development and validation of the H<sub>2</sub>A, the second part reports psychometric properties and validation in a psychiatric and a healthy control sample. Over the past decade agitation has become more and more acknowledged as a serious condition that psychiatric patients suffer a great deal from. Yet agitation still has to become a more specific target in treatment of psychiatric disorders as not only patients in the emergency setting express high levels of agitation. As endpoints for treatment of agitation seem to lack precision (Marder, 2006), the H<sub>2</sub>A meets the demand for a better quantification and understanding of this widely appearing cluster of symptoms. Thus it contributes to a reduction of patient suffering, the practice of compulsory measures and costs in the health care sector (Marder, 2006; Sachs, 2006), while enabling agitation as a predictor for treatment outcome, improving the comparison of treatment efficacy assessment and thereby facilitating stratified medicine.

## 2. Methods

Before drafting items for the H<sub>2</sub>A from a pool of clinical aspects of agitation, several definitions of agitation as a psychological construct were screened (Allen, 2000; Battaglia, 2005; DSM-5, American Psychiatric Association, 2013; Kaplan and Sadock, 1995; Lindenmayer, 2000) in order to create a substantial foundation. The following working construct focussing on non-aggressive forms of agitation was defined:

*“Agitation is a state of mental and/or physiological restlessness. It can either be of entirely mental nature and thereby be non-observable from the outside or it can be accompanied by a physiological component that involves aimless behaviours or fidgety movements on a low-grade organisational level like pacing or jittering.”*

Moreover, existing scales measuring aspects of agitation in various clinical disorders were searched, screened and evaluated. Several scales were rejected as they were developed for specific psychiatric conditions and thus are not applicable to other psychiatric disorders. Besides, all of the following measurements have to be conducted as external assessments (as most of the target patient populations of these instruments exhibit limited responsiveness) and therefore are resource-consuming. The CMAI (Cohen-Mansfield Agitation Inventory; Cohen-Mansfield et al., 1989) was developed for agitation in dementia, while the ABS (Agitated Behavior Scale; Bogner, 2000) aims at patients with

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