A short measure of reality weakness personality characteristics
Evaluation of the validity in Norwegian medical students

Prosjektoppgave
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våren 2013
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ABSTRACT

CONTEXT Reality weakness is a concept related to severe personality pathology, which has been found to predict emotional disturbances in several studies of Norwegian medical students and doctors. However, we lack characteristics of the individuals with high scores on this deviant trait at medical school.

OBJECTIVES This study aims to investigate the levels of reality weakness at the beginning and at the end of medical school, and further, to analyse which factors that are associated with reality weakness cut-off 0/1 at the end of the curriculum.

METHODS This cross-sectional study uses baseline samples of the Young Doctor Cohort (senior students) and the Medical Student Cohort (junior students) of the NORDOC – study (The Longitudinal Study of Norwegian Medical Students and Doctors). Outcome was the reality weakness dimension of the Basic Character Inventory (BCI-36). Both individual factors (age, previous mental health problems, parental bonding) and medical school-related factors (perceived medical school stress and perceived recording skills) were included in a logistic regression model of reality weakness.

RESULTS At the beginning of the curriculum the mean score of reality weakness was 1.9 (SD 1.7), in contrast to 1.1 (SD 1.4) at the end of the curriculum, thus a significant difference in mean score between the two cohorts P < .001 (t = 7.42) with no significant gender difference. Factors independently associated with high reality weakness (cut-off at median or above) amongst senior medical students were; age OR = .88, 95% Confidence interval: (.80-.97), P = .008; previous mental health problems OR = 3.0 (1.6- 5.6) P < .001; maternal overprotection OR = 1.05 (1.0- 1.09) P = .047; perceived medical school stress OR= 1.04 (1.00-1.08) P = .041; and perceived recording skills OR = 0.95 (.90-.995), P = .032.

CONCLUSIONS Factors associated with high reality weakness amongst senior students were: young age, maternal overprotection (control), and perceived medical school stress. High reality weakness was also associated with lower levels of perceived skills in medical recording. These factors may be of importance both with respect to selection of students to medical school and to support and interventions for the students during the curriculum.
INTRODUCTION

In addition to several measures of normal personality traits such as the “Giant three” by Eysenck and the “Big five” by Costa & Mc Crae, (1, 2) there is a need for a short, validated measure of level of personality psychopathology. After development of his personality instrument “Basic character inventory” with the scales of neuroticism, extroversion and compulsiveness (1980) (3), Torgersen included, a fourth dimension, “reality weakness” that was supposed to measure level of personality pathology, or more concretely: “lacking ability to handle inner impulses and to resist outer stimulations” (4).

Individuals with high scores on the “reality weakness” dimension will, according to the definition, perceive the world as overwhelming and experience thoughts on the border between reality and fantasy. This is, however, qualitatively different to the experiences in psychotic delusions. The chronic uncertainty about perceptions of reality makes it difficult for persons to get a true and reliable picture of the world, to have relationships with other people, and to function in the society. Thus, this “reality weakness” dimension was described to be associated with severe personality pathology, such as paranoid, borderline and schizotypic disorders (4, 5).

As a first step of exploring the predictive validity of this “reality weakness” dimension, our group has previously found “reality weakness” to be an important predictor of emotional disturbances among medical students and physicians in the prospective study of two cohorts of NORDOC (The Longitudinal Study of Norwegian Medical Students and Doctors). Even when controlled for other personality traits, the level of reality weakness was predictive of mental health treatment needs during medical school (6), aggravation of suicidal ideation in the first postgraduate years (7), lack of help-seeking for mental health problems in the very first postgraduate years (8), and severe depressive symptoms in a 15-year follow-up among Norwegian medical doctors (9). In the latter study, reality weakness doubled the risk of later GHQ-28-severe depressive symptoms over the years.

Having shown a predictive validity of the “reality weakness” measure, our next step now is to explore whether medical students who score high on the reality weakness dimension, differ from their co-students concerning background, reported mental health problems and stress reactions to medical school. If so, this psychopathology measure could be useful in identifying students with problems and a need for help. It is also of interest to see to what degree the level of reality weakness may change during medical school, an age period which may imply maturing for many young people.

Concerning possible differences between students with high and low scores on reality weakness, individual factors are of importance, such as age, gender, previous mental health problems (6) and parental bonding (10, 11, 12), since we believe early developmental factors to be key as regards development of personality pathology. We also assess any association with medical school-related factors that previously has shown predictive validity in relation to mental health, such as perceived medical school-related stress (13, 6), and perceived clinical and recording skills (14, 15).

Concerning the stability of the levels of reality weakness during the six years of medical school we do not, unfortunately, have follow up data on the same student cohort. Therefore, we have instead compared levels of reality weakness in one cohort of junior students at the beginning of medical school with the levels among senior students in another cohort at the end of medical school. The difference in prevalence between the cohorts can indicate how much “reality weakness” may be looked upon as a trait versus a state.
On this background, and based on data from the two nationwide cohort samples of The Longitudinal Study of Norwegian Medical Students and Doctors (NORDOC), we aim to answer the following question:

(1) What are the levels and prevalence of reality weakness in the two cohorts – one measured at the start of medical school and the other measured at the time of graduation (six years later),

(2) Which individual and medical school-related factors are associated with high reality weakness at the end of medical school?

METHODS

Subjects
In this study we used the baseline sample of The Young Doctor Cohort of NORDOC, to study factors associated with reality weakness. The sample consists of all students who graduated in 1993 and 1994, from all four medical faculties (Oslo, Bergen, Trondheim, Tromsø) in Norway (N= 631). They received postal questionnaires in their last term of medical school. Sampling details have been provided in earlier reports (16). The response rate was 83% (522/631), 57% were women, mean age was 28 (2.8) years. In addition and in order to increase sample size, we also used the one-year follow-up of this cohort, since personality (Reality weakness) and Parental Bonding was measured at random in half the sample at that stage (16, 12); response rate was 71% of baseline (371/522), 56% were women, mean age was 29 (2.8) years.

To study the occurrence of reality weakness at the beginning of the curriculum, we used The Medical Student Cohort of NORDOC. This sample consists of all medical students who entered the four Norwegian medical faculties in 1993 (N=421), and it has been described elsewhere (17). The response rate was 89% (371/421), 54% being women, mean age was 22.1 years.

Methods
Reality weakness
Personality was measured by the 36-item version of the Basic Character Inventory (BCI), which was modified by Torgersen (1980) (3), after Lazare (1966) (18) had constructed the original questionnaire. BCI has been used and successfully validated not only in Norwegian medical students and physicians but also in clinical and other populations (19, 20, 21, 22). The BCI-36 includes the reality weakness dimension that is measured by 9 items, each with a dichotomous response category (true/not true), leading to a range of scores from 0 (low) to 9 (high). The reality weakness dimension was constructed in order to capture personality pathology (4). Examples of the items are: “I experience myself totally different at different points of time”, “Sometimes I seem to live in a fog”, and “It is difficult for me to trust people since they so often turn against me or leave me in the lurch”. Due to comprehensive questionnaires, personality and reality weakness was measured in half of the sample at the end of the curriculum, and the other half was measured at one-year follow-up, and this has been accounted for previously (16).

Levels and prevalence of reality weakness
In order to compare the levels and occurrence of reality weakness in the two cohort samples, we used both mean scores and scores at median and above (high). Since the reality weakness was clearly skewed (see Figure 1 and 2) we chose to dichotomize at the median or...
above (median = 2) in the Medical Student Cohort when we compared the prevalence in the two cohort samples.

**Associations with high reality weakness**

In order to analyse the variables that were associated with reality weakness in the Young Doctor Cohort we chose logistic regressions on high reality weakness based on the median in this very cohort (median =1)

**Age and gender**

Age was measured as a continuous variable. With regard to gender, females and males were coded as 1 and 2, respectively.

**Previous mental health problems in need of treatment**

Previous mental health treatment needs were measured using the questions: “Have you ever had mental health problems?” and “If yes, have you ever sought/received help for this?” Each question had 5 response alternatives: 1, I have had no mental health problems of importance; 2, I have not sought help, although I have needed it; 3, yes, I have consulted a general practitioner; 4, yes, I have consulted a psychologist/psychiatrist; and 5, yes I have been admitted to a hospital psychiatric department. The variable was dichotomized so that those who were in need of help were coded as 1, and those who had no significant problems were coded as 0, and thereafter included in the statistical analysis to control for previous mental health problems. This variable has also been validated in previous studies (16, 13, 6).

**Perceived Parental Bonding**

The parental bonding instrument (PBI) is a 25-item inventory that asks respondents to rate attitudes and behaviours of their parents during their first 16 years of age in terms of two dimensions, care and overprotection. The care dimension of the PBI reflects parental warmth and interest in contrast to rejection and indifference. The overprotection (or control) dimension of the PBI reflects parental overprotection and the fostering of dependency in contrast to the encouragement of autonomy. The participant is asked to report on a 4-point scale from 1 (strongly disagree) to 4 (strongly agree) in two identical forms (25-item), one for each parent (12, 10). As for reality weakness, parental bonding was measured both at the end of curriculum and at one year follow-up, but we believe these perceptions about childhood experience of parents to be fairly consistent over one year.

**Perceived medical school stress (PMSS)**

PMSS was measured by a slightly modified version of Vitaliano’s instrument (23), and it has previously been described in detail (24) and validated by Tyssen (25, 16, 17). The total score of the 13 items (five-point scales; strongly disagree, 1, to strongly agree, 5) indicates high stress (16). The instrument consists of stressor items such as: “medical training controls my life and leaves too little time for other activities”, “medical school fosters a sense of anonymity and feelings of isolation among the students”.

**Perceived recording skills**

Perceived recording skills, was measured by six items covering the preceding (six) patient interviews, and the six items describes the experienced skills in taking a history and write up a medical record, such as: “I’m sure about how to describe my findings from the physical examination”, and “I easily get an overview of the progress of the present illness”.


They have been described in detail elsewhere (16), and the instrument has previously proved predictive validity with respect to work stress and job satisfaction (14, 15).

**Statistics**

We used t-test to compare means of continuous variables, whereas categorical variables were compared by Odds ratios. Logistic regressions were computed to test univariate and multivariate associations between the independent variables and reality weakness cases, in the Young doctor cohort. Significance level was set to 5%, with 95% confidence intervals (CI). Table 1 describes the independent variables.

**RESULTS**

**Levels and prevalence of reality weakness at the beginning and at the end of the curriculum**

At the beginning of the curriculum (Medical Student Cohort), the mean score of reality weakness was 1.9 (SD=1.7), with no gender difference. At the end of curriculum (The Young Doctor Cohort) the mean score of reality weakness was 1.1 (SD=1.4), with no significant gender difference. There was a significant difference in mean score between the Medical Student Cohort and the Young Doctor cohort, \( P < .001 \) (\( t = 7.42 \)), this applied to both genders.

Since the variable was so skewed, we also tested it non-parametrically. We dichotomized at median or above based on the Medical Student Cohort, and this entailed a new high reality weakness variable. In the Medical Student Cohort, 50.2% (186/368) scored high reality weakness (cut-off= 1/2), whereas 27.7% (127/459) scored high reality weakness on the same cut-off in the Young Doctor Cohort, Chi-square = 44.5, \( P < .001 \).

**Factors associated with high reality weakness (cut-off 0/1) in The Young Doctor Cohort (Table 2)**

Factors univariately associated with high reality weakness (cut-off 0/1) were: previous mental health problems OR = 3.4 (2.1-5.6), \( P < .001 \); maternal overprotection OR = 1.05 (1.02-1.08) \( P = .001 \); paternal overprotection OR = 1.05 (1.01-1.09), \( P = .013 \); paternal care OR = .96 (.93-.997), \( P = .033 \); paternal care OR = .96 (.93-.99), \( P = .015 \); perceived medical school stress OR = 1.07 (1.04-1.10), \( P < .001 \); and perceived recording skills OR = 0.93 (.89-.97), \( P < .001 \).

Multiple logistic regressions showed the following significant variables: age OR = .88 (.80-.97), \( P = .008 \); previous mental health problems OR = 3.0 (1.6-5.6) \( P < .001 \); maternal overprotection OR = 1.05 (1.0-1.09) \( P = .047 \); perceived medical school stress OR= 1.04 (1.00-1.08) \( P = .041 \); and perceived recording skills OR = 0.947 (.901-.995), \( P = .032 \).

Additional regressions showed that the statistical suppression of age in the univariate analyses was due to the variable maternal overprotection. We therefore tested how this variable was associated with age, and found a positive correlation between the two (\( r = 0.18, \ p<0.001 \)), which indicates that the older students experienced more maternal overprotection, and this entails that the association between age and reality weakness is negative in the adjusted regression analysis.

We then tested the gender interaction with each of the significant adjusted variables, but none was significant. This means that there were similar effects of the all the significant variables in both men and women.

**DISCUSSION**
At the beginning of the curriculum the mean score of and occurrence of high reality weakness were significantly higher than at the end of the curriculum. In addition, we found that high reality weakness at the end of medical school was linked to the following adjusted factors: young age, previous mental health problems, maternal overprotection, perceived stress and skills at medical school.

Given no cohort differences between these quite representative national samples, this may indicate a decrease in the levels and occurrence of reality weakness during the curriculum. This is very likely, since this deviant “trait” may be presumed to mature out over the years. We found no significant difference between the genders with respect to this decline. Nevertheless, the finding should be validated in a prospective study of the same cohort, since some of those with initial high reality weakness may have dropped out during the curriculum.

From multivariate analysis, young age was significantly associated with high reality weakness, which can support the finding that level of reality weakness decrease during the curriculum. This supports the notion that this trait is related to immature personality characteristics that may improve over the years. Our group has recently also found that lower age is risk factor for future severe depressive symptoms in the NORDOC study (9). Therefore, the age of the applicants might be taken into consideration in selection to medical school. The youngest students may also need more support over the curriculum.

(Univariatly age was suppressed by parental bonding factors, and additional analyses found an association with age here, the older students reported higher levels of maternal overprotection).

In addition to young age, previous mental health problems, or more precisely, previous mental health treatment needs were significantly associated with reality weakness at the end of medical school. High levels of the reality weakness trait of personality may lead to early emotional and functional distress (5) and since such individual characteristics start early, it is likely that students with higher levels of this trait are likely to have had preceding mental health treatment needs. Unfortunately, we do not know anything about diagnoses or treatment schemes for these persons, but previous studies have found that reality weakness predicts lack of help-seeking for such treatment needs (8), and also aggravation of suicidal thoughts, even when controlled for severe depressive symptoms (7).

Parental bonding, as measured by the factor maternal overprotection, was associated with reality weakness in the present study. We have previously found that low maternal care predicts severe depressive symptoms in the same cohort (12, 9), whereas in this study maternal overprotection was the most important factor. Whether these differences in parental bonding dimensions relate to differences in etiology between affective disorders and personality disorders should be further investigated. However, maternal overprotection has previously been associated with personality disorders in studies of other samples (26, 27, 28), and low maternal care has been shown to predict depression also in other studies (29, 30, 31), which to some extent is in keeping with our finding. Such parental experiences and perceptions may also be targeted in psychotherapy, and may be especially feasible for psychodynamic or psychoanalytical oriented interventions.

With regards to medical school-related factors, both perceived medical school stress (PMSS) and lower levels of perceived recording skills were independently associated with reality weakness. Perceived medical school stress has previously been related to both anxiety and depression (23), and it has been validated as a relatively important predictor of mental health treatment needs both in Norwegian medical students (6), and postgraduates (13). But this is the first study to link this stress to symptoms of personality pathology.

Perceived recording skills is a measure of both clinical and communication skills (taking up and writing a medical record or chart), so subjects with high scores on reality weakness would not only experience more stress, but also have problems with relating to
other people and possibly also experience problems in their relationship with patients (4, 32). This is important since it actually gives an indication of poor performance. There is a lack in much research on mental health in students and doctors that the link to performance and patient care. Future research should follow the track that reality weakness may interfere with job functioning and performance, and we should preferably have observation data here. Experienced skills in communication may differ from those observed (Unpublished article, Finset (33))

Furthermore, this interference with skills and performance could be an argument for trying out the evaluation of reality weakness as a part of the admission process at Norwegian universities, which mainly rely on preceding marks and grades for selection at entrance of the best-fit students. A recent Swedish study (34), found that interview-selected students performed better in observed communication skills, and had a lower dropout rate than other students. Evaluation of reality weakness may be a valuable supplement to such interviews.

Strengths of this study are the high response rate, a national representative sample, and the use of validated measures. Further, reality weakness is a quite original concept, that has already been very well predictively validated in the NORDOC cohorts. Unfortunately, with respect to the prevalence of reality weakness we used only available cross-sectional data from the two longitudinal cohorts. Whether the apparent decline in reality weakness levels over the curriculum holds true, should of course be validated in a longitudinal study of the same cohort. BCI and reality weakness, as well as Parental Bonding was measured at two time points in the Young Doctor cohort, one year apart, at random in half of the samples. However, an additional validation multiple regression of reality weakness in the half-sample where BCI was measured only in medical school, successfully validated our findings from the total sample. A final weakness is the measurement of performance (perceived recording skills) with self-report, and this finding should be validated by observations.

In conclusion, the prevalence of reality weakness case was found to be significantly higher among junior than among senior medical students, and this applied to both genders. Factors independently associated with high reality weakness among the senior medical students were; low age, previous mental health treatment needs, maternal overprotection, perceived medical school stress and low levels of perceived recording skills. These findings may be of importance both with respect to selection to medical school and with regards to support and interventions for students with personal or medical skills-related problems. Future research should focus on the role of reality weakness with respect to function and performance in both students and doctors.
REFERENCES


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33 Unpublished article, Finset (TORE; HVA ER TITTEL OG STATUS HER?)

34 Dahlin M, Söderberg S, Holm U, Nilsson I, Farnebo LO. Comparison of communication skills between medical students admitted after interviews or on academic merits. *BMC Medical Education* 2012; **12**: 46.
Figure 1: Scores of reality weakness in the Medical Student Cohort

Histogram

Frequency

BCI-Reality Weakness

N = 368, Median = 2.00, Mean = 1.86, Std. Dev. = 1.69
Figure 2: Scores of reality weakness in the Young Doctor Cohort

Histogram

N = 459, Median = 1.0, Mean = 1.1, Std. Dev. = 1.4
Table 1: Descriptive of associated variables, with means and standard deviation (SD) and percentages

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
<th>Range</th>
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<tr>
<td>Age</td>
<td>28 (2.8)</td>
<td>24-49</td>
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<td>Gender</td>
<td>57% females</td>
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<td>Previous mental health problems</td>
<td>24.2% yes</td>
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<td>Maternal overprotection</td>
<td>10.6 (7.0)</td>
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<td>Paternal overprotection</td>
<td>9 (6.1)</td>
<td>0-36</td>
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<tr>
<td>Maternal care</td>
<td>28.7 (6.2)</td>
<td>0-36</td>
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<td>Paternal care</td>
<td>25.4 (7.0)</td>
<td>0-36</td>
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<tr>
<td>Perceived medical school stress</td>
<td>20.3 (6.8)</td>
<td>3-40</td>
</tr>
<tr>
<td>Perceived recording skills</td>
<td>28.6 (4.8)</td>
<td>15-42</td>
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<tr>
<td>Factor</td>
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