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The world turns at 33 and 45: Defining simple cutoff scores for the Negative Acts Questionnaire–Revised in a representative sample

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Workplace bullying is a serious hazard in every day working life that needs to be assessed carefully. In order to achieve such a goal, both victims of severe bullying as well as targets of less intensive bullying need to be identified, the latter in order to prevent further escalation into severe bullying. Previous research has mainly offered simple and crude measures of who is and who is not a victim of bullying. In this article we show how cutoff scores for the scale Negative Acts Questionnaire–Revised (NAQ-R) can be calculated. Based on a representative sample of the Norwegian workforce, we formulated 2 cutoff points or thresholds for the NAQ-R with a Receiver Operation Characteristic curve. Employees with a score lower than 33 are not bullied, employees with a score between 33 and 45 may be considered as being bullied occasionally, and employees who score above 45 can be considered to be victims of workplace bullying. As the NAQ-R is used in more than 300 research projects worldwide, we hope to inspire other scholars to define similar cutoff points. In addition, we hope that clear cutoff scores may be of assistance to practitioners for designing interventions regarding workplace bullying in line with the identified problems.

Keywords: Cutoff points; Negative Acts Questionnaire–Revised; Receiver operating characteristic; Type I and Type II errors; Workplace bullying.

A meta-analysis of the prevalence of workplace bullying showed that one out of seven employees seems to be a target of some kind of bullying at work (Nielsen, Matthiesen, & Einarsen, 2010). In global terms, millions of people are thereby exposed to some level of workplace bullying. Research has repeatedly shown that bullying has detrimental consequences for those severely targeted. Leymann and Gustafsson (1996) described the severity of the consequences faced by the targets of bullying as analogous to the consequences observed in patients with posttraumatic stress disorder (PTSD). They added, however, that, in contrast to others with PTSD, victims of workplace bullying face their trauma day in and day out. Workplace bullying also seems to have grave negative consequences for organizations as a result of increased turnover and sick leave, combined with lower productivity (Hoel, Einarsen, & Cooper, 2003). Given the tremendous costs related to exposure to workplace bullying, there is a strong need to manage

this occupational hazard. Managing it entails preventing bullying from happening, preventing situations from escalating into severe bullying, and the remediation and the rehabilitation of victims (Spurgeon, 2003).

Managing bullying at work starts with the identification of the phenomenon and its targets (Notelaers, 2011). Interventions are often motivated or initiated on the basis of employees' scores on measurement instruments used in organization-wide surveys. Issues relating to the measurement of exposure to workplace bullying are therefore of the utmost importance. Most studies on the prevalence of bullying have used single and arbitrary cutoff criteria to distinguish victims of workplace bullying from nonvictims based on reports of negative behaviour (Nielsen, Notelaers, & Einarsen, 2011). Notwithstanding the common use of cutoff points in this area, little is known about their diagnostic value. In fact, the established approaches to identifying victims of

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workplace bullying are neither based on sensitivity nor on specificity. They appear instead to be quite arbitrary in nature. Hence, the basic question of classification remains unanswered: "How much direct exposure to negative treatment is needed to label someone a target or victim of workplace bullying?" (Matthiesen, 2006). Empirically based cutoff scores may enable researchers and interventionists to better assess the prevalence of bullying as well as the relative risk in certain working populations (Bilgel, Aytac, & Bayram, 2006; Niedhammer, David, & Degioanni, 2006; Nielsen et al., 2009; Ortega, Høgh, Pejtersen, & Olsen, 2009).

Our aim is to advance this avenue of research by demonstrating the calculation of empirically and theoretically based cutoff scores for the Negative Acts Questionnaire-Revised (NAQ-R; Einarsen, Hoel, & Notelaers, 2009). This will enable researchers and practitioners to detect targets of workplace bullying with respect to both sensitivity and specificity. However, before calculating such cutoff scores, we need to address the concept of workplace bullying, the measurement of workplace bullying, and the current approaches to identify targets or victims of bullying.

THE CONCEPT OF WORKPLACE BULLYING

"Workplace bullying" is a particular type of aggressive behaviour (Aquino & Thau, 2009); it involves direct exposure to systematic and prolonged negative behaviour at work, be it from coworkers or superiors (Einarsen, Raknes, & Matthiesen, 1994; Leymann, 1996). The behaviour involved is predominantly of a psychological nature (Einarsen, 1996), including, for instance, diverse behaviours such as persistent unfair criticism of work, belittling remarks, gossiping, and social isolation. Many of these behaviours may be quite common and may not be perceived as a major problem in themselves (Leymann, 1996). However, when frequently and persistently directed at the same employee, they may constitute a serious source of stress (Zapf, 1999), with a range of negative consequences for those targeted (e.g., psychosomatic complaints, depression, irritation, or even symptoms of posttraumatic stress) (Brousse et al., 2008; Kivimäki et al., 2003; Nolfé, Petrella, Blasi, Zontini, & Nolfé, 2008). A single and isolated event of aggression does not qualify as workplace bullying. Workplace bullying is more a gradually evolving process characterized by a series of negative behaviours systematically directed against employees, who are often unable to counterattack in kind (Einarsen, 2000), leading to victimization. Björkqvist (1992) distinguishes several phases. The first phase is characterized by aggressive behaviour that

is difficult to pin down because of its indirect, discrete, and subtle nature. Later, more direct aggressive behaviours occur. In this phase, the victims are clearly isolated and avoided, and are humiliated in public through excessive criticism or by being made a laughing stock. Eventually, both physical and psychological violence may be used. Building upon Leymann (1990b) and Björkqvist (1992), Einarsen (1999) also identifies several stages: aggressive behaviour, bullying, stigmatization, and severe trauma. As in Björkqvist, the first stage involves negative behaviour that can be characterized as indirect aggression, since it is subtle, devious, and difficult to confront (Adams, 1992); it is sometimes difficult to recognize even for the targets, even though it may constitute a stressor for those exposed to it (Leymann, 1996; Notelaers, Einarsen, De Witte, & Vermunt, 2006). This stage tends to be followed by a stage in which more direct negative behaviour occurs, involving the target being ridiculed, humiliated, and socially isolated (Leymann, 1990b, 1996). Here, the concept of workplace bullying applies, since open, direct, and frequent negative behaviour is experienced (Björkqvist, 1992; Leymann, 1990b, 1996). As a consequence, the target becomes stigmatized and finds it increasingly hard to defend him- or herself (Einarsen, 1999). Finally, severe trauma develops (Einarsen, Hoel, Zapf, & Cooper, 2011). It is clear, therefore, that bullying at work is not an either/or phenomenon. Although longitudinal data that could provide empirical evidence for such a process are lacking, it can still be argued that workplace bullying is a discrete phenomenon; discrete because different stages can be pictured in cross-section. First, there is a situation in which there is no or hardly any negative behaviour present. This is followed by a situation that is characterized by infrequent, but still regular negative behaviour that, strictly speaking, may not be bullying, but may still be unwanted, hurtful, and stressful to the target. Finally, there is a situation in which more direct and frequent negative behaviour occurs that results in severe trauma for those subjected to it.

INVENTORIES MEASURING WORKPLACE BULLYING

Many inventories have been developed to measure direct exposure to workplace bullying and assess the behaviours involved. The NAQ(-R) seems to be the most utilized measurement instrument (Nielsen et al., 2011), however, and its psychometric quality has been thoroughly investigated (Einarsen & Raknes, 1997; Einarsen et al., 2009). Like other inventories, the NAQ-R taps into several domains of negative social behaviour. Some of the 22 items in the NAQ-R

measure negative behaviour that is primarily degrading for the target personally, whereas other items measure negative behaviour that is directed at the target's professional role and his or her ability to carry out his or her work in an appropriate manner. Some items list negative or aggressive behaviours of a more physical nature (Einarsen et al., 2009). However, since the correlation between factors reaches .96 (Einarsen et al., 2009), it is not surprising that most studies treat workplace bullying as a quasi one-dimensional construct. In these studies, the sum score, either based on dichotomizing the response categories of the negative behaviours or on the raw item responses, expresses the extent to which a respondent is directly exposed to workplace bullying. The use of such continuous measures has two flaws. Workplace bullying has a highly skewed distribution. This challenges the use of ordinary parametric statistics to establish "correlates" of the phenomenon. Because the reported means range between "never" and "now and then" and the standard deviation is rather small (Baillien, De Cuyper, & De Witte, 2010; Baillien & De Witte, 2009; Einarsen et al., 2009; Hauge, Skogstad, & Einarsen, 2007; Nielsen et al., 2009; Rodríguez-Muñoz, Baillien, De Witte, Moreno-Jimenez, & Pastor, 2009), there is a risk that research does not focus on the targets of bullying but, instead, on participants who are not being bullied or report limited negative encounters (Notelaers, Einarsen, et al., 2006). This is a challenge in relation to the adequate operationalization of the theoretical phenomenon under investigation.

CURRENT APPROACHES TO SEPARATE VICTIMS FROM NONVICTIMS

A central question in workplace bullying research is how frequently bullying or the negative behaviours must occur before they can be deemed to constitute bullying (Matthiesen, 2006). In medicine and epidemiology, such a dose (a mix of receiving negative behaviours)—response (feeling bullied) paradigm is a common approach to identifying illness (Matthiesen, 2006). Whereas such an approach has been empirically demonstrated with respect to sexual assaults (Stein & Barret-Connor, 2000) and adverse childhood experiences (Chapman et al., 2004), it has not been empirically applied in the area of workplace bullying (Matthiesen, 2006). Various scholars have suggested cutoff points, however. Leymann (1990a, 1990b) was the first to put forward an operational criterion to separate victims from nonvictims. For Leymann (1990b), one negative act per week over a period of at least 6 months was sufficient to identify a respondent as a victim of bullying. Mikkelsen and Einarsen (2001) argue that reporting two negative

behaviours over a period of at least 6 months is required to identify victims of workplace bullying. Finally, Agervold (2007) advocated that respondents should report at least three negative behaviours over a period of at least 6 months to be classified as a victim of bullying. All of these operational criteria are rather arbitrary, and concern has been expressed about their validity. When applying the Leymann criterion, Salin (2001) and Mikkelsen and Einarsen (2001) noted a large mismatch between employees who were classified as victims by this cut off and those who actually labelled themselves as victims based on a definition of workplace bullying. The latter group was much smaller than the former. Another critique is that these kinds of cutoff scores reduce the complex phenomenon of bullying to an either-or phenomenon and do not take into account that bullying is also a process (Notelaers, Einarsen, et al., 2006).

Statistical cutoff criteria have been put forward in addition to operational criteria. For example, Notelaers, Einarsen, et al. (2006) proposed using a latent class cluster approach (see Magidson & Vermunt, 2004) to identify different target groups of workplace bullying in a nonarbitrary way. They found no less than six different target groups that differed in terms of both the nature and the extent of their exposure to workplace bullying, a finding that was also confirmed in later studies (Nielsen et al., 2009; Notelaers, Baillien, Vermunt, De Witte, & Einarsen, 2011). Even though Notelaers (2011) argued that the latent class modelling approach aligns with scholarly views on the process of workplace bullying, the latent class approach takes neither sensitivity nor specificity into account when estimating different target groups of workplace bullying. Thus, diagnostic ability, and especially the ability to detect employees who label themselves as bullied (cf. sensitivity or true positives) and the ability to detect workplace bullying and no other events (cf. specificity or true negatives), is not addressed.

To develop sensitive and specific cutoff values for the Negative Acts Questionnaire-Revised, we propose using a Receiver Operation Characteristic (ROC) curve. Using an ROC, it is possible to calculate cutoff points for the NAQ-R in a way that minimizes the chances of being classified as a target while not being a target (false positives; FP), and the chances of not being classified as a target while actually being a target (false negatives; FN). Following the theoretical reasoning that describes the process of bullying as a discrete phenomenon and not as an either/or phenomenon, there is a need to identify both victims of severe workplace bullying and those in an early stage of consistent, but less severe bullying. This is also of the utmost importance in relation to primary, secondary, and tertiary prevention.

DEFINING A GOLD STANDARD

ROC analysis is a procedure used to assess the diagnostic properties of tests, namely to assess the way measures generally discriminate between categories of subjects (Pintea & Moldovan, 2009). The procedure enables us to determine the ability of a test to discriminate between two groups and to choose the optimal cutoff point. ROC relies upon “a gold standard” for the construction of such cutoff values (Streiner & Cairney, 2007). In medical science, the gold standard is often objective in nature: having or not having a disease. In psychology in general, and in organizational and occupational psychology in particular, however, we are often in a position where the quality of the standard is closer to tin or lead than to gold (Streiner & Cairney, 2007). This is certainly the case in the area of workplace bullying, where the definitional core of the bullying concept rests on the subjective perception of the target that the experienced negative behaviour is hostile and humiliating and that it is directed at him-/herself (Aquino & Bradfield, 2000; Niedl, 1995; Quinney, 1972). A subjective gold standard is therefore necessary. In addition, a subjective approach offers a way of evaluating the imbalance of power between perpetrator and target that is seen as a necessary condition for repeated negative behaviour to be labelled as workplace bullying (Nielsen, 2009). Finally, longitudinal empirical research has shown that a subjective approach, i.e., labelling yourself as a target according to a definition, resulted in a deterioration in health (Kivimäki et al., 2003).

However, the gold standard does not have to rely on the subjective perception of the target alone. As in medical sciences where patients are diagnosed, psychological sciences have established that bullying has very detrimental effects on the psychological health and well-being of those exposed (see Høgh, Mikkelsen, & Hansen, 2011, for an overview). In fact, most researchers on bullying share the view that bullying manifests itself in a negative health outcome for the target (Zapf & Einarsen, 2005). For instance, an impressive body of empirical research reports that exposure to bullying is related to anxiety (Balducci et al., 2010; Baruch, 2005; Bilgel, et al., 2006; Bowling & Beehr, 2006; Hansen et al., 2006; Hauge, Skogstad, & Einarsen, 2010; Kaukiainen et al., 2001; Leymann & Gustafsson, 1996). Moreover, many researchers have found a significant association between exposure to workplace bullying and depression (Adoric & Kvartuc, 2007; Balducci et al., 2010; Bilgel et al., 2006; Hansen et al., 2006; Hauge et al., 2010; Knorz & Zapf, 1996). These findings were confirmed using a longitudinal design (Niedhammer et al., 2006). In addition, there is substantial agreement that targets of bullying show severe psychiatric symptoms (Balducci,

Alfano, & Fraccaroli, 2009; Leymann & Gustafsson, 1996; Matthiesen & Einarsen, 2004; Mikkelsen & Einarsen, 2002), often being in need of treatment (see also Schwickerath & Zapf, 2011). Hence, in addition to the subjective evaluation of the respondent, also known as the self-labelling approach (see also Nielsen et al., 2011), symptoms of anxiety and depression may be used to operationalize the gold standard when evaluating possible cutoffs points for scales such as the NAQ-R.

Because workplace bullying is a complex phenomenon, there are theoretical reasons for distinguishing two different cutoff scores, i.e., a lower threshold in order to be able to detect targets in a preliminary stage of bullying, and a higher threshold cutoff value for detecting targets of severe bullying/victims. Hence, two “gold” standards are needed that are based on both subjective and objective criteria. In our case, we will propose two combinations of the self-labelling approach to measuring workplace bullying and a measure of psychiatric symptoms of anxiety and depression.

METHODS

Design and sample

To demonstrate the calculation of cutoff scores for the NAQ-R, the present study is based on a reanalysis of a representative sample of the Norwegian workforce (Nielsen et al., 2009). Our aim is to demonstrate the calculation of cutoff scores. This is an extension of and innovation in relation to this dataset because we offer researchers on bullying an integrative approach to classifying targets of workplace bullying. A total of 2539 questionnaires were satisfactory completed and included in this study. The mean age in the sample was 43.79 ($SD = 11.52$) years, with a range from 19 to 66 years. The sample consisted of slightly more women (52%) than men (48%). Five and a half per cent had less than 11 years of education, 51% had between 11 and 13 years, 34% had between 14 and 17 years, and 9.5% had 18 years or more. They were in full-time (71.6%) or part-time (18.5%) employment, with almost 80% of the respondents working daytime hours. Altogether, 20% had a leading position with personnel responsibility. With the exception of women being slightly overrepresented, the demographic findings can be considered to be representative of the Norwegian workforce (Høstmark & Lagerstrøm, 2006).

Measures

The Negative Acts Questionnaire–Revised (NAQ-R; Einarsen et al., 2009) measures exposure to a range of specific negative behaviours at work (cf. *supra*). For

each of the 22 items, respondents were asked to indicate how often they had been exposed to the behaviour in question during the last 6 months. Response categories were coded from 1 to 5 with the alternatives “never”, “now and then”, “monthly”, “weekly”, and “daily”. The scale contains no reference to the term “bullying” and all items are written in behavioural terms. The NAQ-R showed a Cronbach’s α of .90. Traditionally, when identifying victims of workplace bullying using the NAQ-R, the response categories are dichotomized into 0 (“never”, “now and then”, and “monthly”) and 1 (“weekly” and “daily”) in order to count the number of weekly behaviours reported (Nielsen, 2009). We will refer to this practice as the “dichotomous sum score approach” in the remainder of this article. The average in the present study is 0.28, with a standard deviation of 1.14. This approach has been criticized, however. In particular, Notelaers et al. (2006) underlined that many, yet less frequent, negative behaviours may accumulate and lead to the experience of workplace bullying. We therefore propose to work with raw scores and add them up to form a single sum score in order to explore optimal cutoff points. We will refer to the latter as the “raw sum score approach” in the remainder of the article. The average in the present study is 26.75, with a standard deviation of 6.16. Both approaches will be investigated to determine the most accurate approach, however.

The gold standard is based on two measures: a self-labelling measure that is often used in the area of workplace bullying (Nielsen et al., 2011) and the Hopkins Symptoms Check List-25 (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974), which is a screening instrument designed to identify common psychiatric symptoms (Nettelbladt, Hansson, Steffansson, Borgquist, & Nordström, 1993). The self-labelling measure is a one-item measure of victimization from bullying according to a formal definition of bullying at work applied to the respondents’ situation (see also Einarsen & Skogstad, 1996; Olweus, 1991). In this study, respondents were asked to state whether or not they considered themselves to have been a victim of bullying at work during the last 6 months according to the following definition: “Bullying takes place when one or more persons systematically and over time feel that they have been subjected to negative treatment on the part of one or more persons, in a situation in which the persons exposed to the treatment have difficulty in defending themselves against them. It is not bullying when two equally strong opponents are in conflict with each other” (Einarsen, Raknes, Matthiesen, & Hellesøy, 1994; Olweus, 1991). The response categories were “no”, “yes, but rarely”, “yes, now and then”, “yes, once a week”, and “yes, several times a week”. Perceived victimization from bullying is measured

using this method. In relation to bullying in both working life (Einarsen & Skogstad, 1996) and in school (Solberg & Olweus, 2003), “now and then” is deemed to be the lower cutoff point for bullying when employing the self-labelling method. In line with Leymann (1990, 1996), a majority of scholars (for an overview, see Nielsen et al., 2010) define labelling oneself as being exposed to bullying weekly as the threshold for severe bullying.

Mental health among the respondents was assessed with the 25-item version of the Hopkins Symptoms Checklist (HSCL-25; Derogatis et al., 1974). The HSCL-25 is a widely used screening measure that includes symptoms of anxiety and depression. Examples of items are “Suddenly scared for no reason”, “Feeling fearful”, “Poor appetite”, and “Crying easily”. The measure its reliability was satisfactory (Cronbach’s $\alpha = .92$). Nettelbladt and colleagues (1993) tested the HSCL-25 against psychiatric interviews using the Present State Examination. They presented two cutoff criteria for the HSCL-25. A value ≥ 1.75 represents the cutoff value for cases in need of psychiatric treatment, whereas a value ≥ 1.55 defines probable psychiatric caseness (Sörensen, 1987).

Analysis

A common way of calculating cutoff scores for a questionnaire or a test is to apply the Receiver Operation Characteristic (ROC), where the percentage of false negatives (FN) and false positives (FP) for each score on a test is investigated. The ROC curve shows the severity of the tradeoff between sensitivity and specificity, which is used to determine what the “optimal” cutoff should be. The latter is then identified as the score where both types of error are minimized, i.e., where the sum of Type I and Type II errors reaches its minimum. In an ROC analysis, this cutoff score is found using the Youden index, which is a linear combination of sensitivity and specificity (Cutoff = Specificity + Sensitivity) (Youden, 1950). The accuracy of a test (i.e., the ability of the test to correctly classify cases with a certain condition and cases without the condition) is determined by the “area under the curve” (AUC; Streiner & Cairney, 2007). It is a test of the overall quality of the ROC operation. A rule of thumb is that “the accuracy of a test with AUCs between 0.5 and 0.7 is low; between 0.70 and 0.90, the accuracy is moderate, and it is high for AUCs over 0.90” (p. 125). The AUC is a nonparametric statistic (Hopley & van Schalkwyk, 2001), which means that it is not affected by the shape of the underlying population (Hanley & McNeil, 1982). This property fits the bullying concept very well because the latter is not normally distributed at all.

In the present article, we will estimate two ROC functions, one for each gold standard, in which both the dichotomous and the raw sum score approaches will be tested. Based on the reasoning elaborated on earlier, the “gold” standards were defined as follows:

- Labelling oneself as being subjected to bullying at least “now and then” according to the definition described in the measurement section, and scoring equal to or higher than 1.55 on the HSCL-25, which indicates a probable psychiatric case.
- Labelling oneself as being subjected to bullying at least weekly according to the definition described in the measurement section, and scoring equal to or higher than 1.75 on the HSCL-25, which indicates a case in need of treatment.

RESULTS

Since two cutoff scores were estimated for the NAQ-R in order to determine from what point or score one is occasionally or severely bullied, two ROC functions were calculated, each with a different gold standard. In the following paragraphs, we will substantiate the lower and higher threshold cutoff score for both the dichotomous and raw sum score approach, and determine which is most appropriate. Thereafter, the optimal cutoff scores will be chosen.

First, Table 1 portrays the frequency of the negative behaviours.

As mentioned earlier, in order to determine the lower threshold cutoff score (see also Einarsen & Skogstad, 1996; Olweus, 1991; Solberg & Olweus, 2003) on the NAQ-R, i.e., occasionally exposed to bullying, we used a gold standard that combines the responses to the definition of workplace bullying “now and then or more often” with an HSCL-25 score ≥ 1.55 . The measure of accuracy of the classification, i.e., the Area Under the Curve (AUC), produced by both the dichotomous and the raw sum score approaches exceeds the threshold of 0.7. The raw sum score approach is highly accurate (an AUC of 0.98), whereas the sum of the dichotomous score approach is bordering on highly accurate (an AUC of 0.90). Table 2 shows that the dichotomous sum score approach leads to a one-act criterion because the maximum specificity and sensitivity are reached at that score. Hence, “at least weekly one negative act during the last 6 months” is identified as a lower cutoff threshold. Table 2 also shows that this cutoff point was associated with 12.1% false positives and 12.5% false negatives.

The raw sum score approach leads to a better tradeoff between true negatives (NP) and true positives (TP). The optimal cutoff point of 33 is associated with 11.4% false positives and 0% false negatives. This is a substantial difference compared with the dichotomous sum score approach. The

TABLE 1
Frequencies of negative behaviours

<i>Negative behaviours</i>	<i>Never</i>	<i>Now and then</i>	<i>Monthly</i>	<i>Weekly</i>	<i>Daily</i>
1. Someone withholding information which affects your performance	55.3	37.4	4.1	2.9	0.3
2. Being humiliated or ridiculed in connection with your work	87.6	11.2	0.6	0.4	0.2
3. Being ordered to do work below your level of competence	50.4	40.0	3.1	3.0	3.5
4. Having key areas of responsibility removed or replaced with more trivial or unpleasant tasks	76.5	20.2	1.5	1.1	0.7
5. Spreading gossip about you	84.2	14.0	1.1	0.5	0.2
6. Being ignored or excluded	89.2	9.6	0.6	0.4	0.3
7. Having insulting or offensive remarks made about your person, attitudes, or private life	81.1	17.1	1.1	0.7	0.1
8. Being shouted at or being target of spontaneous anger	80.3	17.5	1.3	0.8	0.1
9. Insulting behaviour	95.3	3.9	0.4	0.3	0.1
10. Hints or signals from others that you should quit your job	94.2	4.9	0.7	0.1	0.1
11. Repeated reminders of your errors or mistakes	85.0	14.1	0.5	.2	0.1
12. Being ignored or facing a hostile reaction when you approach	83.9	13.8	1.4	0.7	0.2
13. Repeated criticism with respect to your work and effort	90.7	8.2	0.5	0.4	0.2
14. Having your opinions ignored	67.4	28.8	2.6	1.0	0.3
15. Practical jokes carried out by people you do not get along with	86.8	11.8	0.8	0.5	0.2
16. Being given tasks with unreasonable deadlines	69.1	26.2	2.0	1.1	1.7
17. Having allegations made against you	89.0	9.9	0.7	0.3	0.1
18. Excessive monitoring of your work	88.8	8.9	0.7	0.7	0.8
19. Pressure to not claim something to which by right you are entitled to	92.0	7.0	0.6	0.2	0.1
20. Being the subject of excessive teasing and sarcasm	94.9	4.2	0.3	0.1	0.5
21. Being exposed to unmanageable workload	71.5	24.3	1.3	2.4	0.6
22. Threats of violence or physical or actual abuse	97.6	2.1	0.2	0.1	0.1

difference is almost entirely attributable to the strong decrease in false positives: classifying someone as at least occasionally bullied when the subject does not label him- or herself as a victim of bullying and is unlikely to show mental health symptoms.

To determine the higher threshold cutoff point on the NAQ-R, i.e., severe exposure to bullying, we used a gold standard that combines the self-labelling response "once a week or more often" with an HSCL-25 score ≥ 1.75 . Here, the AUCs of both the dichotomous and the raw sum score approaches are very high: the AUCs are 0.99 (Table 3). The dichotomous sum score approach points towards the one behaviour criterion. However, after augmenting the true negative rate, four negative behaviours during the last 6 months seems to be an optimal cutoff point. This four-act criterion was associated with 14.3% false positives and 0.1% false negatives. With the raw sum score approach, a better tradeoff is obtained between TN and TP. The optimal cutoff point in the raw score approach is 45, which is associated with 1.7% false positives and no false negatives at all.

Both the AUC and the rate of TN and TP imply that the raw sum approach outperforms the dichotomous sum score approach, and 33 and 45 are therefore the most trustworthy cutoff points for the NAQ-R. Table 4 summarizes the findings. Table 4 shows that using a sum score of 33 as an optimal cutoff point for a lower threshold means that 9.6% of the Norwegian working population was occasionally bullied. Moreover, the cutoff score of 45, which is the higher threshold estimate, means that 2.1% of the Norwegian workforce was victims of workplace bullying. Altogether, therefore, approximately 12% of the Norwegian workforce was at least occasionally exposed to workplace bullying.

DISCUSSION

Workplace bullying is a very complex phenomenon that is difficult to disentangle. It is often described as an escalating process during which those targeted may end up as victims of psychological aggression against which they have difficulty defending themselves (Aquino & Thau, 2009; Zapf & Einarsen,

TABLE 2
Lower threshold: Cutoff score

<i>Sum of raw scores</i>				<i>Sum of dichotomized scores</i>			
<i>Cutoff</i>	<i>Sensitivity TP</i>	<i>Specificity TN</i>	<i>Sensitivity + Specificity</i>	<i>Cutoff</i>	<i>Sensitivity TP</i>	<i>Specificity TN</i>	<i>Sensitivity + Specificity</i>
22	1.000	0.000	1.000	0	1.000	0.000	1.000
23	1.000	0.207	1.207	1	0.875	0.879	1.754
...	...	...	...	2	0.688	0.955	1.643
31	1.000	0.855	1.855	3	0.50	0.982	1.482
32	1.000	0.876	1.876	4	0.50	0.993	1.493
33	1.000	0.892	1.892	5	0.438	0.995	1.433
34	0.938	0.910	1.847	6	0.375	0.997	1.372
35	0.938	0.925	1.863	7	0.313	0.999	1.311
36	0.875	0.933	1.808	8	0.250	0.999	1.249
37	0.875	0.942	1.817	9	0.250	1.000	1.250
...

TABLE 3
Higher threshold: Cutoff score

<i>Sum of raw scores</i>				<i>Sum of dichotomized scores</i>			
<i>Cutoff</i>	<i>Sensitivity TP</i>	<i>Specificity TN</i>	<i>Sensitivity + Specificity</i>	<i>Cutoff</i>	<i>Sensitivity TP</i>	<i>Specificity TN</i>	<i>Sensitivity + Specificity</i>
...	...	...	...	0	1.000	0.000	1.000
40	1.000	0.962	1.962	1	1.000	0.875	1.875
41	1.000	0.967	1.967	2	0.857	0.952	1.809
42	1.000	0.974	1.974	3	0.857	0.981	1.838
43	1.000	0.977	1.977	4	0.857	0.992	1.849
44	1.000	0.980	1.980	5	0.714	0.994	1.709
45	1.000	0.983	1.983	6	0.571	0.996	1.567
46	0.857	0.985	1.842	7	0.571	0.998	1.570
47	0.857	0.988	1.846	8	0.429	0.998	1.427
...

TABLE 4
Final percentages of true and false scores with the distinct cutoff scores

<i>Golden standards</i>	<i>Exposure groups based upon ROC</i>			<i>Total</i>
	<i>Not bullied</i>	<i>Occasionally bullied</i>	<i>Victims</i>	
Lower threshold	(sum < 33)	(45 > sum ≥ 33)	(sum ≥ 45)	
Self-labelling less than occasionally <i>and</i> HSCL < 1.55	TN 88.3	FP 9.3	FP 1.4	99.0
Self-labelling occasionally or more <i>and</i> HSCL ≥ 1.55	FN 0.0	TP 0.3	TP 0.7	1.0
Higher threshold	(sum < 33)	(45 > sum ≥ 33)	(sum ≥ 45)	
Self-labelling less than weekly <i>and</i> HSCL < 1.75	TN 88.3	TN 9.6	FP 1.7	99.6
Self-labelling weekly or more <i>and</i> HSCL ≥ 1.75	FN 0.0	FN 0.0	TP 0.4	0.4
Total	88.3	9.6	2.1	100.0

2005). To measure exposure to and the prevalence of the phenomenon, several different instruments based on so-called behavioural lists have been constructed, the best known of which are the Leymann Inventory Psycho Terror (Leymann, 1990) and the Negative Acts Questionnaire (Einarsen & Raknes, 1997)–Revised (Einarsen & Hoel, 2001). Such behavioural lists are considered to be trustworthy and valid measures of the phenomenon (Einarsen et al., 2009; Nielsen et al., 2011). In the past, researchers have attempted to construct cutoff scores with the aim of identifying who is and who is not considered to be a victim of workplace bullying. As many as 80–90% of all respondents claim to have been exposed at least occasionally to one such behaviour over the last 6 months (Einarsen & Raknes, 1997). Several practical and simple cutoff scores (Agervold, 2007; Leymann, 1990a; Mikkelsen & Einarsen, 2001) have been suggested. They do tend to be quite arbitrary, however, reducing the process of workplace bullying to an either/or situation (Notelaers, De Witte, Vermunt, & Einarsen, 2006). In addition, neither of the estimates in use has been tested in relation to its diagnostic value, i.e., its capacity to detect individuals who are bullied and its capacity to identify workplace bullying and not some other phenomenon. In this article, we aimed to advance this line of research by using a Receiver Operating Curve (ROC) to show how we could calculate two simple cutoff points for bullying exposure based on the sum score of the Negative Acts Questionnaire–Revised. In accordance with the theoretical notion that workplace bullying is a process of varying intensity, we aimed to identify targets of less severe bullying, who are probably in an earlier stage of the bullying process, and targets of severe bullying, who are also labelled victims.

Depending on the gold standard, the ROC analysis revealed two simple cutoff values for the NAQ-R. The lower threshold cutoff point of 33 indicates that the respondent is at least occasionally bullied; the higher threshold cutoff point of 45 indicates that the respondent can be characterized as a victim of severe workplace bullying. Applied to

the current sample, 88% of the respondents can be characterized as “not bullied”, having sum scores of between 22 and 32. Next, a group of almost 10% of this representative Norwegian sample was identified as occasionally bullied, with a sum score of between 33 and 44. And, last but not least, there is a victims’ group of 2% who had sum scores of at least 45. Workplace bullying is thus a substantial occupational hazard in Norwegian working life, as shown in previous research (Einarsen & Skogstad, 1996).

Using the NAQ-R, the proposed cutoff scores for the groups “not bullied”, “occasionally bullied”, and “victims of severe workplace bullying” rely on a raw sum-score for the items based on the original response set (1 = “never”, 2 = “now and then”, 3 = “monthly”, 4 = “weekly”, and 5 = “daily”). Not recoding the response categories to dichotomies, as is regularly done in studies using scales like the NAQ-R, but using the full range of responses instead, was associated with a higher area under the curve. This higher level of accuracy is of the utmost importance because it is associated with a lower level of erroneous classification, thereby resulting in more trustworthy thresholds. Thus, our analysis showed that, from a statistical perspective, dichotomizing negative behaviours is not advisable because it not only reduces the item variances (Notelaers, De Witte, et al., 2006) but also leads to less accuracy. The percentage of false positives in particular increased strongly. The raw sum score approach shows that, with a sum score of more than 32, respondents are being exposed to a wide range of negative behaviours, even though each individual act may occur less frequently than weekly, and have symptoms of reduced psychological well-being although they may not necessarily be in need of treatment. This is in line with the idea that bullying can start as a highly subtle and barely observable event, even to the targets (Björkqvist, Österman, & Hjelt-Bäck, 1994; Einarsen et al., 2011). Above 44, the respondent is exposed to a wide range of negative behaviours, probably on a weekly basis, which translate into strong symptoms of reduced psychological well-being, pointing to a

possible need for treatment. This is also concordant with the literature that describes the bullying phase as a phase in which exposure to recurring, open, direct negative behaviour can end in trauma (Einarsen et al., 2011; Leymann, 1996).

The calculation of two cutoff points, i.e., a lower (33) and a higher (45) threshold estimate of bullying, can be considered a more parsimonious way of aligning the theoretical notion that bullying is a process with the latent class cluster approach that has recently been introduced to disentangle workplace bullying (Notelaers et al., 2011). However, it still reduces the complexity of the phenomenon to three stages: a stage in which one is not or hardly at all confronted with negative behaviour, a stage in which one is confronted with different but probably less frequent negative behaviours, and a stage in which one is confronted with many different negative behaviours. The fact that a latent class cluster approach has led to more target groups (stages), i.e., six (Nielsen et al., 2009) or seven (Einarsen et al., 2009), raises the question of how much complexity is needed to grasp the process of workplace bullying. In the strict sense, only longitudinal data analysis would be capable of answering that question. With a three-wave panel design, it is possible to study the transitions of respondents through various stages over time. To date, designs that would enable the study of latent transitions are still lacking.

Practical implications

We believe it is apt to draw an analogy with traffic lights, where green corresponds to “OK to drive”, where amber signals a situation where it is necessary to brake, and where red means full stop. When managers, HR personnel, organizational psychologists, or other consultants use the NAQ-R, they may interpret employee scores between 22 and 32 as being in the green zone, where there is no real bullying going on and no forceful action is necessary. This does not mean that there is no room for primary prevention. For instance, organizations can start with a bullying policy. Although research has shown that many organizations only pay lip service to such policies (Salin, 2008), a bullying policy is fundamental. It serves two roles: as a statement of intent and as a document that guides all stakeholders through the formal and informal processes relating to bullying prevention (Rayner & Lewis, 2011). Guidelines, a code of ethics, and terms of contract can be derived from it. Awareness training can be combined with the policy, whereby employees learn about emotional intelligence and develop interpersonal skills that can help them to identify bullying (see, e.g., Hoel & Giga, 2006).

When the employees score between 33 and 43, the organization should take this as an amber warning

signal, as they are now dealing with employees who are exposed to a low yet systematic level of workplace bullying, and who are perhaps in danger of becoming more bullied if the situation deteriorates. These employees also have a personal sense of being bullied and are very likely to suffer from reduced psychological well-being. Theoretically, bullying is an escalating process where the target risks facing increasingly harsh treatment (Einarsen, Hoel, Zapf, & Cooper, 2003; Leymann, 1996). In such a situation, secondary preventive measures need to be enforced, probably involving conflict management strategies (see, e.g., Hoel & Giga, 2006) and organizational development measures that address the quality of the social climate at work (see, e.g., Baillien, De Witte, Notelaers, & Neyens, 2008). Whether assistance should be given individually or collectively is undecided. The size of this group (10%) might suggest that a collective intervention would be more economical in terms of use of the organization's resources. Clear and fair procedures for enforcing the policy are required (see also Einarsen & Hoel, 2008) in order for individual employees to be able to voice their complaints.

When employees have a score on the NAQ-R that exceeds 44, a red light must flash, as the organization is now dealing with victims of severe bullying who have a strong sense of being victimized by bullying and are highly likely to be in need of psychological treatment. In this situation, primary and secondary prevention is no longer sufficient, since these employees are heavily exposed to negative behaviours from others at work. Again, the organization needs a policy with fair complaint procedures to investigate the nature of the each individual victim's situation. In addition, the aim of the intervention must be to rehabilitate the victim and restore a bullying-free work situation. Victims must be assisted immediately and most probably individually. In this context, there is promising news from AHG Berus hospital in Germany, where leading therapist Schwickerath integrates cognitive-behavioural therapy with the results of workplace bullying research. This approach has led to the empowerment of employees, 20% of whom were able to go back to their former workplace (Schwickerath & Zapf, 2011). However, it should not stop at providing individual assistance to victims with the aim of remedying the situation and rehabilitating those exposed. There is a tradition in safety research whereby incidents or accidents initiate organizational learning (Flanagan, 1950) in organizations (Rasmussen, 1994; van Vuuren, 1999). Here, observed critical incidents are analysed and possible antecedents are identified in order to implement effective prevention measures, eliminate the source, and, if this is not possible, prevent the damaging effects associated with the source(s). To achieve this, however, it is necessary to safeguard the rights of those who may be identified

as perpetrators while ensuring a fair investigation, fair interventions, and disciplinary measures.

Strengths and limitations

The representative sample used in the present study enables us to generalize the findings to the Norwegian working population (Nielsen & Einarsen, 2008). Whether these cutoff scores can be generalized to other countries is an empirical question. We hope that the present study will inspire others who have at their disposal a representative sample of the working population, a good measure of workplace bullying or other related constructs, and a definition that meets all the theoretical key concepts, to estimate cutoff scores in a similar way.

The categorization of a continuum reduces variance to a large extent and is therefore rarely seen as a fruitful practice. However, because bullying is a very skewed distributed variable, it is a good idea to categorize it in a meaningful way. In general, empirical research in this domain has reported means and standard deviations indicating that the overall majority of employees hardly report any repeated negative behaviours (Nielsen, 2009; Zapf, Escartin, & Einarsen, 2011). As a result, established correlates of workplace bullying in empirical research articles are likely to express relationships between not being or hardly being bullied and both antecedents and consequences. Because traditional statistical tools have largely been used to establish such relationships in scholarly papers, victims may be outliers in the statistical sense. Outliers obscure the use of such tools if they are not omitted from the analysis. More fundamentally, hardly encountering negative behaviour or encountering limited negative behaviour as a central mode (cf. average) of such a continuum, does not really qualify as an operationalization of the concept of workplace bullying, which essentially involves repeated negative behaviour. In addition, such a continuum makes it difficult to model the process of workplace bullying in a statistically adequate way. Bullying has been described as a process in which the stages are qualitatively different (Björkqvist, 1992; Einarsen et al., 2011; Leymann, 1996). The categorization of the NAQ-R scale using an ROC analysis is better aligned with this theoretical concept, which defines qualitatively different situations. If respondents have a score of less than 33 on the NAQ-R, they hardly experience any negative behaviour. If respondents have a score of between 33 and 44, they are in a situation in which they are confronted with infrequent, but still regular, negative behaviour, which, strictly speaking, may not constitute bullying but which is stressful and unpleasant. From a score of 45 upwards, respondents are in a situation in which they repeatedly face negative

behaviour that is associated with a strong stress response, i.e., a traumatic situation.

As a method of grasping the process of workplace bullying, ROC has the advantage that it is a distribution-free, nonparametric technique. This fits the theoretical construct of workplace bullying and its skewed distribution. Nonparametric techniques could be very useful in investigating the development of workplace bullying, and its antecedents and consequences. Because latent class growth models (Vermunt & Magidson, 2005), latent transition models (Collins, 2006), and latent class Markov models (Paas, Vermunt, & Bijmolt, 2007) are becoming better known, researchers will have a modern array of powerful statistical tools to qualify changes and their causes and consequences in depth. Hence, by calculating the two cutoff scores of 33 and 45, we may have made it easier for future users of the NAQ-R to estimate the prevalence rate of workplace bullying, whether for applied or scientific purposes.

One criticism is that the gold standard is not error-free. Labelling yourself as a target of workplace bullying is not free of error because personality, emotional and cognitive factors, and misperceptions can figure as potential biases. For instance, shame can result in a respondent avoiding labelling him- or herself as a victim of bullying, because admitting it can be threatening to his or her self-esteem (Nielsen, 2009; Out, 2005). This could explain some of the false negatives found in the present study. Because an impressive body of evidence, including longitudinal research, has shown that being bullied is associated with ill-health and psychiatric symptoms such as anxiety and depression, the gold standard was not only limited to self-assessment of bullying. Validated cutoff points for symptoms of anxiety and depression measured using the HSCL-25 (cf. Nettelbladt et al., 1993) were used in combination with the self-labelling question. However, since both measures stem from the same questionnaire and were measured at one point in time, common method bias could still exist, increasing the AUC somewhat. Last but not least, there could be a confounding factor of a biological nature. Genetic variation in the 5-HTTLPR, a degenerate polymorphic region in gene SLC6A4, has been shown to be a moderator between victimization and the risk of developing emotional problems (Sugden et al., 2010).

If there is no “real” gold standard, i.e., no error-free detection of an event or a nonevent, one way of formulating a gold standard is to define the diagnostic problem in terms of measurable clinical outcomes (Zweig & Campbell, 1993). To collect measurable clinical outcomes in the future, it might be necessary to start with standardized patient records analogous to medical records. In medicine, these are the benchmarks for determining what

clinicians do in the course of a patient visit (Dresselhaus, Luck, & Peabody, 2002). In this way, in addition to self-labelling and the use of symptom checklists, researchers also have clinical data available to further fine-tune the cutoff scores identified in the present study.

CONCLUSION

Workplace bullying, a traumatic social stressor (Zapf, Knorz, & Kulla, 1996) with highly detrimental outcomes for those exposed (Balducci, et al., 2009), is omnipresent in working life (Nielsen et al., 2010; Zapf et al., 2011). In connection with the use of questionnaires such as the Negative Acts Questionnaire-Revised (Einarsen et al., 2009), various scholars have proposed cutoff scores to distinguish victims from nonvictims when employing measures that rely on scales containing items of a behavioural nature (Agervold, 2007; Leymann, 1990b; Mikkelsen & Einarsen, 2001). In earlier attempts to define easy-to-use cutoff scores, however, the result has been rather arbitrary cutoff scores of unknown validity. In contrast to these attempts, the present study takes both sensitivity and specificity into account, establishing the optimal cutoff scores for the NAQ-R using a large and representative sample. The results revealed that it is not only wise but also valid to distinguish three groups of respondents in such survey studies: the “not bullied”, the “occasionally bullied”, and “victims of severe bullying”, with scores of 33 and 45 as the cutoff criteria distinguishing these groups from each other. It is our hope that this study and its results will help both practitioners and researchers to employ these easy-to-use and valid cutoff scores when estimating the prevalence of workplace bullying, whether for applied or theoretical purposes.

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