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How does one measure gambling problems?
Reliability and validity of the NORC DSM-IV Screen for gambling problems.

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Sammanfattning
The purpose of this psychometric study was to evaluate the reliability and validity of NORC DSM-IV Screen for gambling problems self–assessment version (NODS-SA) in a population of people seeking treatment for their gambling problems (n=319). The NODS-SA showed a high one week test–retest reliability (r=0.77 p<.0001). The internal consistency measured by Cronbach's alpha was quite low for the two occasions (α=.47 and .52). Hence, a factor analysis was performed with the results that all items separately measured the same factor. To further evaluate the NODS-SA as a screening instrument, diagnostic interviews with 34 subjects were completed and compared with the results of the self-administered NODS. These show a 100% agreement by stating the same diagnosis independent of method. It is concluded that the NODS-SA can be used as a screening instrument, at least in a self-restricted pathological gambling population.

Nyckelord
pathological gambling, validity, reliability, psychometrics, NODS

Abstract

The purpose of this psychometric study was to evaluate the reliability and validity of NORC DSM-IV Screen for gambling problems self–assessment version (NODS-SA) in a population of people seeking treatment for their gambling problems (n=319). The NODS-SA showed a high one week test–retest reliability (r=0.77 $p<.0001$). The internal consistency measured by Cronbach's alpha was quite low for the two occasions ($\alpha=.47$ and .52). Hence, a factor analysis was performed with the results that all items separately measured the same factor. To further evaluate the NODS-SA as a screening instrument, diagnostic interviews with 34 subjects were completed and compared with the results of the self-administered NODS. These show a 100% agreement by stating the same diagnosis independent of method. It is concluded that the NODS-SA can be used as a screening instrument, at least in a self-restricted pathological gambling population.

How does one measure gambling problems?
Reliability and validity of the NODS screening instrument.

The welfare in Sweden today is something everyone can take part of and the demands to travel, eat luxurious food and have a nice home environment are constantly raised. At the same time our opportunities to gain fast money on different kinds of games increase. The well-being that is achieved through gaining money is dependent on how much we already have. The more we have the less it means (Bernstein, Penner, Clark–Stewart & Roy, 2003). To gain money while taking part in a lottery does not give a person much higher satisfaction. If we have enough money to cope with our daily life, there are no studies that show that happiness increases with an expanding wealth (Klein, 2003). Gambling is not a new phenomenon but it is not until sometime in the 1970's that the first study has been found where gambling problems are measured. In the 1980's American Psychiatric Association (1980) formed a diagnosis in the Diagnostic and statistical manual of mental disorders (DSM) and thereby criteria were set for what was considered to be a gambling problem (Jonsson, 2005).

It is of great interest that we find appropriate psychological screening instruments for the identification of people that suffer from gambling problems and to provide help. But how can gamble problems be measured in an effective way? Different instruments have been developed to do this and criteria have been set for how we shall perceive the concept. The South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987) was the first screening instrument developed for gambling problems and it was based upon the third issue of the DSM (American Psychiatric Association, 1980). However, when the fourth issue of the DSM was published the criteria for gambling problems had been revised and new screening instruments developed. One of them is the NORC DSM-IV Screen for gambling problems (NODS), which is the basis for this study. There is a lifetime-version and a 12-months version of this instrument but the latter will be used for this study (Gerstein et al., 1999). When it comes to the evaluation of existing screening instruments developed after the new criteria, set in the DSM-IV (APA, 2000), it is conspicuous by its absence (Jonsson, 2005; Abbot, Volberg, Bellringer, Reith, 2004; Gerstein et al., 1999; Volberg, 2004). The subject is of great immediate interest considering the increasing access of games and therefore an estimated enlarged amount of problem gamblers. The question, if there is a correlation between the access of gambling possibilities and a rising amount of problem gamblers, has been confirmed in several studies (Volberg, 2004). Shaffer, Hall and Vander Bilt (1997) concluded in a meta-analysis that gambling increases. There is also a need to standardize research in the area by for example finding common factors that lead to gambling problems (Pallesen, Mitsem, Kvale, Johnsen & Molde, 2005; Abbot, Volberg, Bellringer, Reith, 2004; Gerstein et al., 1999). In this way the measurements can be comparable and evaluated.

The Swedish government regulates the gambling market and applies restrictions to establish businesses that benefit from gambling. There are three major operators and they are: *Svenska spel, ATG, and non-governmental organizations*. The system is similar to that in other Scandinavian countries like for example Norway (Lund & Nordlund, 2003). Access to the Internet has developed a new interest of poker via illegal sites. The illegal gambling market is estimated to be 23% of the total gambling in Sweden (Spelinstitiutet, 2006). At a Nordic research seminar in Helsingfors in 2005, regarding gambling problems, the need to collect further research and to regulate the Internet gambling was emphasized.

This study was undertaken to evaluate the NODS-SA screening instruments validity and reliability. It can also contribute to the question of how the NODS-SA screening instrument based on DSM-IV, works in real life.

Theoretical background
In this section different theoretical input angles of why people become problem gamblers will be presented.

The gambling market is variable which makes it hard to study, but there are also other factors that make it difficult to get hold of. The complexity of playing ranges and the fact that some type of games more easily lead to an addiction can make analysis the more difficult. There is also the question of comorbidity – that means the connection between gambling and other risk and problem behaviors that has to be considered when studying gambling problems (Jonsson, 2005).

Biological researchers explain the phenomenon of gambling problems by studying the reward system of our brain. Humans have this system in order for us to do things that are important for our survival; like eating, having sex, and so on. Gambling problems are seen as a constant addiction and each individual has a different set of genes which makes us more or less vulnerable to be subjected to these addictions. When a person becomes a problem gambler the brain is reconstructed and the compulsion takes such a large part of the activity that there is not much room left for other things like expressing feelings for others. This was confirmed in a study where people with a drug addiction were shown a pornographic video. They did not get as aroused by the film as control groups. People with gambling problems want more and more of the pleasure the gambling gives and disregard everything else. A tolerance develops and the individual wants to play more otherwise symptoms of withdrawal will take place (Spelinstitutet, 2006; Ortiz, 2006).

Research in the area of the cognitive behavioral sciences is on the march when it comes to intervention of different psychological diseases. A name that often recurs in this context is Robert Ladouceur who has contributed with a lot of knowledge in the area of gambling problems. Cognitive behavioral therapy (CBT) seeks to change irrational thoughts about gambling and sees them as the cause of the problems as well as the factor that maintains them. These thoughts can for example contain unrealistic ideas about chances of winning by ignoring random and of the own ability to influence the situation (Ladouceur et al., 2001; Ortiz, 2006). The CBT model is constantly improved and different kinds of interventions for gambling problems like individual therapy, group therapy, self–help, and Internet-based treatment are available. Research is extensive and results show that people who are treated with these interventions do better than control groups (Ladouseur, 2005; Ladouseur et al., 2001; Pallesen et al., 2005; Echeburúa, Fernández–Montalvo, & Báez, 2000; Sylvian, Ladouceur, & Boisert, 1997; Dowling, Smith, & Thomas, in press). More optimistic thoughts of chances of winning have been found among problem gamblers and pathological gamblers in several studies when compared to groups without gambling problems (Lund, & Nordlund, 2003; Jonsson et al., 2003).

Another way to look at the phenomenon is represented by the behavioral scientists. They are of the opinion that the basis of gambling problems originates from the reward that is contained through winning. This is called *operant conditioning* (Sundel, Sundel, 2004). Hence, they assume that it is easier to develop an addiction if the person in the beginning of his gambling career gains a lot of money (Ledgerwood & Petry, 2005). This was reported as

one of the factors provoking gambling problems in the Norwegian prevalence study (Lund & Nordlund, 2003).

The psychodynamic explanation mock–ups seek causes in one's adolescence that affect the developing of gambling problems. Unfortunately there is less research within these types of assessments – probably because they are harder to measure and last longer periods of time than for example CBT. But there are shorter versions of this type of therapy today like for example the Interpersonal Therapy (ITP) and Time–Limited Dynamic Psychotherapy and it would be interesting to see more research results from these (Compas & Gotlib, 2002). Several studies confirm that most of the people suffering from gambling addiction also mention a complicated adolescence with feelings of being unaccepted. It is also common that the same people report an early gambling start (Jonsson et al., 2003).

Research questions

1. What is the one week test–retest reliability for the 12-month version of the NODS-SA screening instrument, in a gambling population?
2. What are the Cronbach's alpha (α) values for the NODS-SA?
3. Are there any point total differences for the two administration times?
4. How high is the agreement between a clinical diagnostic interview and NODS-SA?

Methods

In this paper, psychometric methods are used for the evaluation of a psychological screening instrument. This method is commonly utilized to measure psychological variables for research and practice. The approach is mostly deductive as it emanates from previous research concerning gambling problems and NODS as well as other screening instruments. The measurement was made quantatively by statistical tests in SPSS Version 14.0. Data originates from self–recruited subjects attending an Internet-based program for gambling problems using self-training and group discussions (Carlbring, 2006). Assessment interviews were also conducted to collect further data.

Selection
At the time of this study there were 319 people who had registered for the treatment program. To be assigned, one had to fill out the NODS-SA twice and be diagnosed as a pathological gambler. Originally 590 people applied and filled out NODS 1 but only 319 were included in the study. Reasons for exclusion were for example: they did not make an effort to fill out the second form; they were not diagnosed as pathological gamblers; they had not gambled during the past month; they did not gamble for money; or they were under the age of 18. People who seemed to suffer from more serious psychological problems were also excluded form the treatment and thereby also this study. The participants' average age was 32.7 years (SD=9.15) and their gender distribution was 268 (84%) men plus 51 (16%) women. A demographic overview, shown in Table 1, has been made to provide a summary of some facts about the participants and to facilitate cross-study comparisons (Table 1).

Table 1
Demographics of participants of this study (n=319)

Demographic	Sum	Proportion
Civil status		
Single	89	28 %
Single with child	22	7 %
Living with partner	73	23 %
Living with partner and child	96	30 %
Living with parent/relative	22	7 %
Living with friends	7	2 %
Other	10	3 %
Education		
Elementary school or nine-year school	57	18 %
2–4 years at high school	160	50 %
University or collage	102	32 %
Work		
Gainfully employed	195	61 %
Studying, practice	41	13 %
Labor-market action	10	3 %
Unemployed	41	13 %
Early retirement pens./On the sick-list	25	8 %
Other	7	2 %
Debts		
Yes	204	64 %
No	94	29 %
Missing	21	7 %
*If yes, amount in debts (SEK)**		
1,000 – 19,999	48	23 %
20,000 – 99,999	75	37 %
100,000 – 2,000,000	81	40 %
Personal income (SEK)		
Low income (0 – 209,999)	145	45 %
Average income (210,000 – 399,999)	149	47 %
High income (400,000 or more)	17	5 %
Do not wish to answer	8	3 %
Country of birth		
Sweden	278	87 %
Other country	41	13 %
Parents born in Sweden	242	76 %
Parents born in other country	77	24 %

[*] (M=130.376 SD=219.363)

The respondents' psychological health measured by different screening instruments
The respondents filled in four different types of screening instruments with the purpose to measure their psychological health. The results form the Hospital Anxiety and Depression Scale (HADS; Cooper, Taylor, Cooper & Fairburn, 1987) and Montgomery Åsberg Depression Rating Scale (MADRS; Svanborg & Åsberg, 1994) show that the respondents had a mild to moderate depression (M=8.59, SD=4.14; M=20.99, SD=10.32 respectively). The answers from HADS when measuring anxiety confirmed that the respondents suffer from moderate anxiety (M=10.63 SD= 4.27). Finally the Quality of life inventory (QOLI; Frisch, Cornell, Villanueva, & Retzlaff, 1992) concluded that the participants life quality was lower than people seeking help for panic syndrome (M=0.56, SD=1.63).

The participants' main problem game
An overview of the participants' major problem game is presented in Table 2.

Table 2
An overview of the participants' major problem game

Type of game	Sum	Proportion
Internet poker	109	34.2 %
Jack Vegas at a restaurant	89	27.9 %
Internet casino	34	10.7 %
Gambling at horse–racing	27	8.5 %
Internet betting on sports gamble	14	4.4 %
At Swedish Casino Cosmopol	14	4.4 %
Odds	12	3.8 %
Other (e.g. the numbers game, cards)	20	6.1 %

Procedure
While assigning for the treatment program people were asked a large number of questions and some of this information was used in this study. The first questionnaire contained 99 questions and the second which was completed one week later contained questions testing psychological health (HADS, MADRS, QOLI). The NODS first measurement (NODS 1) as well as the second measurement (NODS 2) was included in these questionnaires. Consequently, the participants had filled out the NODS screening instrument on the Internet with a week interval. Data was inserted in Microsoft Excel and when necessary, categorized. Great effort was made to make acquaintance with the content of the material. Data was received from Per Carlbring associate professor at the Department of Behavioral Sciences at Linköping University and had never been used or analyzed before. After this, data was exported to SPSS Version 14.0, where the statistical analysis later took place. As the internal consistency was low a decision to further evaluate the screening instrument by conducting telephone interviews was made. These were made from a secret phone number and were semi–structured as the questions were adapted according to the ten items of the screening instrument with the *Structured clinical interview for DSM-IV Axis I Disorders* (SCID) as a model (First, Gibbon, Spitzer, & Williams, 1997). The interviews were conducted by the author who in two weeks will graduate as a Social Behavioral Scientist in Psychology at the University of Linköping, Sweden. Noteworthy is that none of the respondents had started treatment when the interviews were conducted. Effort was made to pose open questions with the intention to encourage detailed and rich answers (Bryman, 2002). Information of anonymity was delivered and a cinema ticket was offered and sent by mail to the respondents.

The sample size ended at 34 people who correspond as 66% of the total amount of people that were contacted. The remaining 34% did not answer with the exception of three people, who did not wish to participate in an interview.

Internet-based treatment program for pathological gamblers
The treatment program was formed in 2004-2006 through a research project at the Department of Behavioral Sciences at the University of Linköping, Sweden. The university has for some time observed and evaluated assessment possibilities through self-help treatment on the Internet. This has become a continuous project, and focus now lies on the possibility of effective treatment of gambling problems with this method. The treatment finances are handled by The Swedish National Institute of Public Health (SNIPH), and therefore it is free of charge. The method is based on cognitive behavioral therapy and individual and group discussions as well as home assignments are a part of the treatment. Ethical principles have been applied and approved by *The Regional Ethical Review Board in Uppsala,* 2004, 2005 respectively and these were also enclosed in present study. Before the participants of this study registered for the treatment program information of their rights to anonymity, the possibility to cease treatment, and that data only would be used by researchers within the project, was served. An acknowledgement according to the law of personal information was also required. The program has been evaluated with the results that 76% of the people that concluded the treatment were relieved of their problems and six moths later the amount was increased to 91%. A control group who was waitlisted for treatment was compared with the 76% that received treatment, and only 9% from this group were rid of their problems (Carlbring, 2006).

The NODS screening instrument
NODS screening instrument was first developed in 1999 when Gerstein and co-workers made a large prevalence study in America concerning gambling problems. There were already several other screening tests measuring gambling problems available at the time but in spite of this they decided to develop a new one. The reason was that none of the, at the time, four existing tests developed after the DSM-IV criteria were considered to be good enough. They had not been evaluated in clinical settings and no research about these instruments was available. The SOGS screening instrument could not be used either as the National Gambling Impact Study Commission had specified that all criteria in DSM-IV were to be included in screening instruments used for prevalence studies. SOGS – being based on the older version of DSM – only enclose some of these criteria and thereby had to be excluded from the study. NODS was formed to be more restrictive in diagnosis than SOGS as the researches suspected that the latter showed results of false positives (Gerstein et al., 1999). In the present paper the NODS-SA which is presented in Table 2 was utilized. The abbreviation SA simply means self–administered and despite the name there are no further differences compared to the original NODS. The instrument was translated to Swedish by Jakob Johnsson, psychologist at the International Gambling Research Team of Sweden, and approval was given by the authors to conduct this study. It originally contained 17 questions but some of the ten criteria were operationalized resulting in the 19 questions shown in Table 3. In the study made by Gerstein and co-workers 1999, the participants had to have lost at least $100 to be diagnosed as pathological gamblers. This limit was not employed in present study. The maximum score is 10 and the cutoff–values are: 1–2 of the DSM-IV criteria corresponds to "At-risk gambler", 3–4 "Problem gambler", and finally 5–10 of the DSM-IV criteria is classified as a "Pathological gambler".

Table 3

Questions in the 12-month NODS-SA screening instrument matching the DSM-IV criteria

DSM-criteria	Questions in NODS-SA.
Preoccupation	1. Have you, during the past year, had periods lasting 2 weeks or longer when you spent a lot of time thinking about your gambling or planning future gambling events? 2. Have there, during the past year, been periods lasting 2 weeks or longer when you spent a lot of time thinking about ways of getting money to gamble with?
Tolerance	3. Have there been periods during the past year when you needed to raise our bets in order to get the same feeling of excitement?
Withdrawal	4. Have you, during the past year, tried to stop, cut down or control your gambling? 5. If so, have you been restless or irritable during the past year when trying to limit or stop your gambling? 6. Have you been restless or irritable during the past year when you did not have the opportunity to gamble?
Loss of control	7. Have you tried but not succeeded in stopping, cutting down or controlling your gambling during the past year? 8. If so, has it happened three times or more during the past year?
Escape	9. Have you gambled as a way to escape from personal problems during the past year? 10. Have you gambled to relieve uncomfortable feelings such as guilt, anxiety, helplessness or depression during the past year?
Chasing	11. Has there been a period during the past year when you lost money gambling one day, you would return another day to get even?
Lying	12. Have you, during the past year, lied to family members, friends or others about how much you gamble or how much money you lost on gambling? 13. If so, has this happened three or more times during the past year?
Illegal acts	14. Have you, during the past year, taken money that did not belong to you or borrowed money without asking to pay your gambling/gambling debts. 15. Have you done something illegal to pay for your gambling or gambling debts during the past year?
Risked significant relationship	16. Has your gambling caused serious or repeated problems in our relationships with any of your family members or friends during the past year? 17. Has your gambling caused you any problems in school, such as missing classes or days of school or your grades dropping during the past year? 18. Has your gambling caused you to lose a job, have trouble with your job or miss out on an important job or career opportunity during the past year?
Bailout	19. Have you needed to ask family members or anyone else to loan you money or otherwise bail you out of a desperate money situation that was largely caused by your gambling during the past year?

Data analyses

Reliability. Data was tested in respect of its reliability. The statistic program SPSS Version 14.0 was used for this analysis. A *test–retest reliability* of the results from the NODS-form was made comparing the two times the form was filled out with one week time interval. The correlation between these two measures will answer the question of *stability* of the

NODS-test. A Cronbach's alpha test was used to measure the *internal consistency*. This is a check up on whether the items are related to the same factor. Finally Cohen´s kappa was calculated to measure the understanding between interview and NODS-SA and thereby the *inter–rater reliability* of data. (Bryman, 2004; Bryman, 2002; Clark-Carter, 1997).

Validity. The validity – that means if we actually measure what we claim to measure – was tested in several ways. It is important that the respondents' understand what the test is designed to test. They can be affected by the purpose of the study and for example answer in accordance with the researchers' expectations. They can also lie about the severity of their problem and this is something one wants to avoid. These types of questions are discussed when talking about *Face validity* (Clark-Carter, 1997). The researcher has to weigh the information that is delivered against the danger of the participants being aware of the research question being tested. This also becomes relevant when discussing Internet-based screening instruments and how they may or may not affect the way that people answer.

Content validity is measured when one wants to make sure that the items in NODS totally cover the full range of the phenomenon pathological gambling (Clark-Carter, 1997). This study can only evaluate existing items in NODS and was not constructed to control for other contributing factors leading to gambling problems. This type of validity can be tested by consulting experts in the area of gambling problems why comparisons to the results from other studies were made. A factor analysis was also made to check whether the items contributed separately to the same factor or if any of items were redundant.

Concurrent validity can be examined by measuring the same thing but with different methods. This was done by measuring NODS via both self-administered screening instruments and diagnostic interviews. Statistical measures were made to ascertain the relationship between the variables by calculating the correlation coefficient.

When it comes to psychometric papers the *convergence validity* is a very common measure. This means that the researcher compares his screening instrument with other instruments measuring the same thing, by making statistical tests (Bryman, 2002). Unfortunately this could not be done in this study as only one screening instrument is included, but nonetheless comparisons were made through a discussion of NODS and other comparable screening tests.

Results

What is the one week test–retest reliability for the 12 month version of the NODS-SA screening instrument, in a gambling population?
The question of NODS test–retest reliability was answered by correlation between the first and second administration. It showed at high and significant correlation (r=.77 <.0001).

What are the Cronbach's alpha (α) values for the NODS-SA?
Internal consistency demonstrates low values of $\alpha = .47$ for NODS first measurement and $\alpha = .52$ for second measurement.

Are there any point total differences for the two administration times?
When performing a t–test comparing significant between total scores on NODS 1 and NODS 2 some differences could be found (M=8.21, SD=1.53; M=8.03, SD=1.56 respectively) t(318) = 2.996, *p* <.003. However, the effect size was low Cohen´s d = .116 which means an almost irrelevant difference.
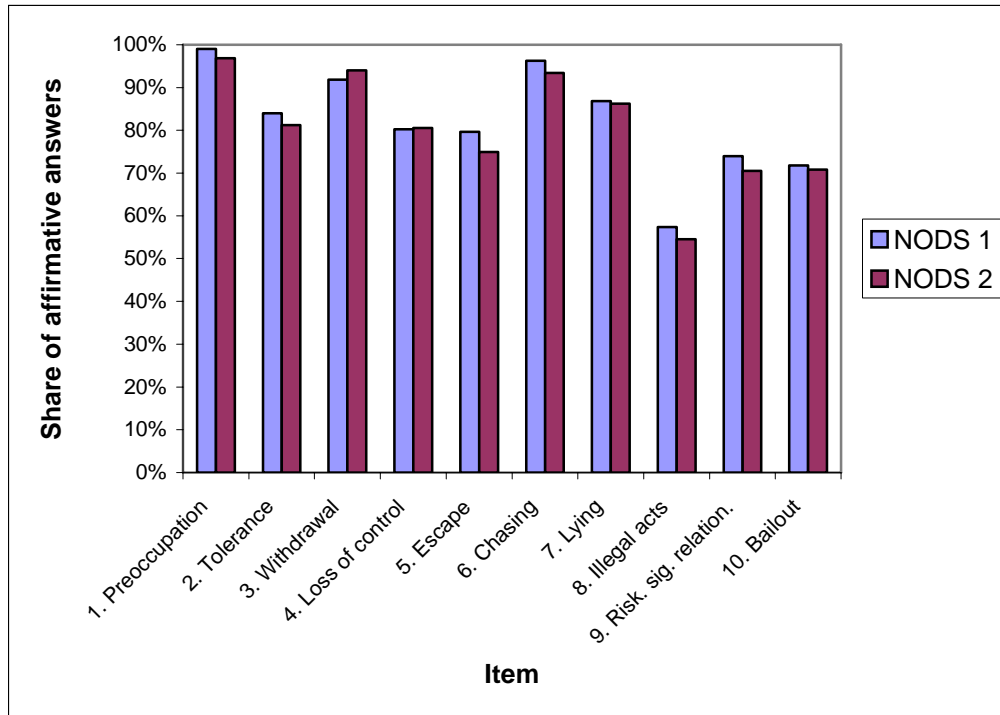

Figure 1. Overview of the results from NODS filled in two times and the distribution by DSM–IV criteria.

As evident from Figure 1 the three most frequent items were Preoccupation, Chasing, and Withdrawal whereas the most infrequently reported were Illegal acts and Bailout.

How high is the agreement between a clinical diagnostic interview and NODS-SA?
As shown in Table 4, the agreement between diagnosis by interview and NODS-SA was excellent (Cohen´s kappa = 1.0) n=34. This was also analyzed by Pearson´s correlation test, r=0.73,(p=.000) n=34.

Table 4
Agreement between diagnosis by interview and NODS self-administered.

		NODS-SA	
		Gambler	Non-gambler
Human Clinical Interview	Gambler	33	1
	Non-gambler	1	33

Discussion

This paper was undertaken to evaluate the NODS-SA screening instrument and it has been proved that it functions as a good measurement for the sample. While making this study it has become obvious that comparing different studies within the area of gambling problems is not an easy assignment. Different screening instruments are used to measure gambling problems and one can discern differentiating diagnostic thresholds.

One of the promising results received from this study was the test–retest reliability which was very good (r=.77) n=319. Even better results were presented by Gerstein et al., (1999) when testing the NODS screening instrument in a clinical sample (r=98) n=44 for test-retest reliability with a 2-4 week interval.

When it comes to the measurements of the internal consistency of NODS-SA there were some results with alarming figures. This calls for speculation as Cronbach's alpha has shown good results (r=.77) in the Norwegian prevalence study (Lund & Nordlund, 2003). Compared to this study one could argue that present paper had a *restriction range* – meaning that, as the sample only included pathological gamblers it is limited in scope. Hence there is a risk of a *ceiling effect* among the participants' (Clark-Carter, 1997). Prevalence studies utilize randomized samples representative for a wider population. This could be one elucidation for the relatively low values when it comes to internal consistency.

Could it be that we can look upon the items in NODS as different group of factors contributing to pathological gambling? Due to the low values the internal consistency the idea of a factor analysis was born. However, after a principal component analysis was run it was clear that this was not the case for data in this study. Three items showed eigenvalues plus 1, but loaded differently and therefore no categories could be found. Hence, the factor analysis shows that it is likely that all items contribute separately to measure gambling problems similar to the findings of the factor analysis of NODS in Toce–Gerstein et al, (2003). The content validity was in this way confirmed. Furthermore, all items loaded over .40 to the main factor and thereby none were redundant.

The results from the t-test show that there were small but significant differences between the total scores of NODS 1 and NODS 2. However, they could be ignored as the effect size turned out to be low. When it comes to the discussion of the DSM-IV criteria this study can contribute with some information. In consecutive order Preoccupation, Chasing, and Withdrawal comprised the most frequently reported items. Examples of other studies with consistent findings are the Norwegian prevalence study (Lund & Nordlund, 2003) with Chasing, Preoccupation, and Tolerance as their most common items, and in the Swedish prevalence study they were Preoccupation, Chasing, and Tolerance (Rönnberg et al, 1999). Illegal acts and Bailout were the least frequently reported items in similar fashion of previous studies. It has also been shown that they are more of an indicator of severity among pathological gamblers than criteria that can differentiate between pathological gamblers and non–gamblers (Zimmerman, Chelminski Young, 2006; Toce-Gerstein et al., 2003). However if one or maybe both of these criteria is to be excluded from DSM-IV could not be said from this study. More research is needed which also include and evaluate other possible criteria. To establish common factors that lead to gambling problems one needs to get hold of all the people that suffer from this condition. Today Laduoceur, (2005) estimates that only 10% of

the pathological gamblers seek help and this is consistent with findings in other studies (Jonsson et al., 2003; Abbot, Volberg, Bellringer, Reith, 2004).

The *inter–rater reliability* was measured by the agreement between a human clinical interview and NODS-SA and showed excellent results. As the interviews were conducted to a group with expected pathological gamblers one may argue that this is not so surprising. However, this was not known to the interviewer and furthermore the one person that did not measure up to the diagnostic threshold was correctly diagnosed. Though diagnosis between interview and NODS-SA was excellent there were some differences in the respondents' answers. One could see that the question of illegal acts differed the most. It is obvious that the question is delicate and this may be one of the reasons why this small discrepancy appeared. One may think it is easier to admit illegal acts when filling out an Internet-based form compared to a telephone-interview. Some researchers have found that the former yield more candid answers compared to real life tests (Johnson, 1999). But when it comes to research in this area resent conclusions are drawn in a different direction - that is, Internet vs. paper administration yield similar results (Austin, Carlbring, Richards & Andersson, 2006). There are several advantages with having questionnaires filled out on the Internet. For example, they can be completed at home in a calm environment at a suitable time; be more cost-effective; facilitate reaching a large sample; all questions can be compulsory; and data can easily be converted to a statistical program for analysis (Austin et al., 2006; Carlbring et al., 2005). Recently recommendations for their use have been made (Austin, et al., 2006) and the results from this study can further confirm their validity.

This section will undertake the discussion of the methods and measurements that were used and then some demographic data will be discussed. As within-group comparisons are utilized in this study test–retest measurement can control for differences between groups that may lead to diverging answers. It is important to try to control potentially contaminating factors when conducting research. However, as a control group would have made it possible to compare the test–retest reliability between gamblers and non-gamblers, this can also be a shortcoming. This limitation affects the internal validity. As the sample was collected through self-recruitment and only consisted of pathological gamblers one can simply discuss the results among a self-restricted pathological gambling population. The possibility to replicate the study is estimated to be high on data collected via the internet. Positive aspects of Internet-administered tests will be discussed below. When it comes to the interviews, replication becomes more complicated. However, the fact that a well known method was used as a model, *Structured clinical interview for DSM–IV Axis I Disorders* (SCID; First, Gibbon, Spitzer, & Williams, 1997) makes replication less problematic. The validity was shown to be high as both NODS-SA and the diagnostic interviews showed the same results. To further evaluate the diagnostic interviews one could have recorded the interviews and assigned another person to have an independent second opinion. The interviews were performed by a graduate in Social Behavioral Science in Psychology. In previous research it has been shown to be quite common that interviewers are conducted by laymen (Kessler et al., 1994; Bland, Newman, & Orn 1998; Regier et al., 1988; Weissman & Myers, 1980). Therefore the fact that the interviewer was not a psychologist is not considered as a problem for the validity.

The typical gambler has been stated as a man who is single, under the age of 45, was born abroad, living in a big city, is low educated and worries about his health and economic situation (Rönnberg et al., 1999). Some researchers have found that pathological gamblers

were more likely to have a low income and that they were not as likely to be well educated (Jonsson et al., 2003). In this study almost half of the participants' (45%) had a low income. When it comes to education only 18% had finished elementary school or nine-year school and 50% had studied 2–4 years at high school. Some of the participants' were young and therefore it is hard to draw any conclusions from weather the participants' represent a group not so well educated. It could be that the results hide a change of direction when it comes to education, indicating that the fact that people who gamble are less educated is a trend that has turned. However, as mentioned this is hard to say from these results. The demographics differ from the average-gambler when it comes to civil status and origin when only 35% of the participants' in this study were single or single with a child, and only 13% were born in a country outside of Sweden. People who assigned for treatment were to the greater part men similar to the results of previous studies (Rönnberg et al., 1999; Jonsson et al., 2003; Lund, & Nordlund, 2003).

It is clear, and not so surprising that people play more on Internet-games today. A comparison with the Swedish prevalence study made by Rönnberg et al, (1999) confirms this. The most critical game to play for pathological gamblers was slot machines at restaurants. Football pools and horse games were the most favored games in 1999 but now one can see that in 2006 Internet poker and on-line casino games are stated as favorites by almost 45%. Abbot and Volberg (1992), found that pathological gamblers play more on fast and continuous games like lots, horse games, and casino games in their study. This is also equivalent with previous research. Today people in Sweden can play Jack Vegas machines at a restaurant or on the Internet. This was the second most popular game stated by almost 28% of the participants in present study.

When it comes to psychological health it seems like suicide and suicide attempts are overrepresented in this group (Johnsson et al, 2003). The results from MADRS screening instrument showed that the respondents' suffer from moderate depression which means that they could be in the risk zone of being suicidal. HADS anxiety and depression scale showed average results of a mild depression and moderate anxiety. Furthermore, the participants' life quality was lower than people seeking help for panic disorder. Consequently the results clearly point towards that the psychological health among the people in the study was bad.

As previous studies also have concluded (Gerstein et al, 1999; Jonsson, 2005) there is a need to standardize the screening tests for gambling problems. How can we for example compare SOGS-R to NODS when they are based on different factors? As Jonsson, (2005) mentions in his basis for discussion of prevalence studies in the Nordic countries, SOGS-R is a well known and frequently used instrument but NODS has also shown to be a god and valid instrument in recent research. SOGS-R contains more questions about finances of gambling and only a few of the DSM-IV criteria are covered by this instrument. A person who often borrows money is more likely to be diagnosed as a pathological gambler when measured with SOGS-R. This instrument has also been known to show higher values than NODS and therefore a risk for false positives is obvious (Volberg, 2002; Moore 2001; Lund & Nordlund, 2003). When Gerstein et al, 1999 developed NODS the participants' had to have lost at least $100 or more at some time in a lifetime to be diagnosed as pathological gamblers. The minimum $100 lost criteria was not applied in present study but comments from a prevalence study made in Oregon, comparing the SOGS and NODS, argue that this item could be discerned as causing some of the differences between the instruments (Moore, 2001). However it is not likely that this is the only factor causing the discrepancies. NODS cover all of the DSM-IV criteria but has no questions about the persons own perception of their

gambling problem. This is something NODS has been criticized for. The item "spent more time and money than I intended" has also been reported as a missing item in NODS when compared to SOGS-R (Moore, 2001) The discussion of which screening instrument to use will most certainly not end here. However, the conclusion from Jonsson, (2005) literature review was that the screening instruments that were based on the DSM-IV criteria were superior to those who were not (Jonsson, 2005). A complete description of SOGS can be found in Leiseur & Blume, (1987). This study was based on the evaluation of NODS screening instrument for gambling problems ant it has shown to be an effective screening instrument when it comes to measuring self–restricted pathological gambling population.

Further research within the area of gambling problems is desperately needed. One needs to do research on general populations so that the factors that lead to gambling problems can be evaluated. Tests need to be made to evaluate the specificity and sensitivity of the items but one should also be open to the idea of categorizing items.

Acknowledgements

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