*The Influence of Internal Versus External Attributions of Crime Causality: A Comparison between Experts, Semi-Experts and Lay-People.*

**Jennifer Murray, Mary E. Thomson**

**Abstract**

The overarching aim of the present research was to investigate the possible effects of attribution on the decisions made by clinicians in comparison to those made by trainee psychologists and lay-people. A 3x3x2 mixed groups design was implemented, with the variables: clinical experience (expert, semi-expert, lay-person), crime type (murder, assault, armed robbery) and scenario manipulation (internal/external attribution). Participants read nine crime scenarios, which were developed based on real case notes and supplemented with information on specific offender characteristics (see Grant *et al*, 2001; Normandeau, 1972; Quinsey & Cyr, 1986). Scenarios were either internally or externally manipulated, with participants being blind to this manipulation. For each scenario participants were asked to rate offender dangerousness, likelihood of re-offending, seriousness of crime and suggest a suitable sentence length. McAuley *et al’s* (1992) Revised Causal Dimension Scale was employed after each scenario in order to assess the effectiveness of the internal/external manipulations. 3x3x2 ANOVA’s were employed to investigate the main factors of interest, with the IV’s: clinical experience, crime type and scenario manipulation. Significant interactions were found in both the recommendations of dangerousness and offender responsibility. Findings indicate that semi-experts are less subject to the influence of internal/external manipulations of crime scenarios than both experts and lay people. Marked similarities in the pattern of expert and lay-person judgments can be observed from the present analyses. The current findings suggest that on-going training relating to decision making biases may help to decrease the effects of attribution in clinical decision making.

**Introduction**

This article concerns violence risk assessment, a task of critical importance to psychiatrists, clinical psychologists, legislators, magistrates, social workers and various others concerned with the accurate prediction of violent behaviour. The clinical approach to violence risk assessment, which relies entirely on human judgement, is the most commonly used method in practice (Cooke, Michie & Ryan, 2001; De Vogel & De Ruiter, 2004). Despite its real-world prevalence, considerable academic scepticism has been expressed in relation to the predictive accuracy of this approach (e.g., Monahan, 1984; Quinsey, Harris, Rice & Cormier, 1998), with Monahan (1984) claiming that two out of three predictions of long term violence made by clinicians are incorrect. While this claim is frequently cited as evidence that clinical judgement is poor, Litwack (2001) suggested that there is little empirical support for the statement. On the contrary, various studies have found clinicians to perform significantly above chance (e.g., Bonta, Law & Hanson, 1998; Gardner, Lidz, Mulvey, & Shaw, 1996; McMillan, Hastings & Coldwell, 2004). According to Litwack (2001), there has been a rush to negative judgement about clinicians’ capabilities in this context without a fair review of the clinical enterprise.

This negative perception of clinical judgement arose for various reasons. The most notable being the Baxstrom ruling in the USA in 1966, which resulted in 967 offenders being released or transferred from maximum-security correctional psychiatric hospitals into the community or to civil hospitals. It was expected that this ruling would have devastating consequences. However, only 20% of the sample was reconvicted after four years, for mostly non-violent crimes (Steadman & Cocozza, 1974). The results of the Baxstrom natural experiment were widely publicised and used as indirect evidence that clinicians have little expertise in predicting violent outcomes.

Other factors contributing to the perceived inadequacy of clinical judgement include claims that it is inferior to actuarial assessments and that it is no better than lay assessments (e.g., Quinsey *et al.*, 1998). In relation to the first of these claims, research focussing on clinical versus actuarial comparisons is fraught with methodological difficulties (Litwack, 2001; Litwack, Zapf, Groscup & Hart, 2006). Many of the studies claiming to demonstrate actuarial advantage have not directly compared the methods using the same subject population. As pointed out by Litwack (2001), of seven studies that did use the same subject population, two favoured clinical judgement (i.e., Gardner *et al.*, 1996; Holland, Holt, Levi & Beckett, 1983), two favoured actuarial assessments but were not cross-validated (i.e., Hall, 1988; Hassin, 1986), and the remaining three were inconclusive (i.e., Quinsey & Maguire, 1986; Smith & Lanyon, 1968; Wormith & Goldstone, 1984). It can therefore be argued that previous research fails to support the superiority of any one method.

Similar difficulties cast doubt on the negative conclusions regarding expert and lay comparisons. For one thing, most studies cited as evidence that professional clinical judgements are no more accurate than those of lay persons are not only very old but tend to concern clinical judgements other than violence risk assessments (e.g., Goldberg, 1959; Chapman & Chapman, 1967).

One study that did concern violence risk assessment was conducted by Quinsey and Cyr (1986). This study investigated the possibility of clinical judgement being subject to attribution error in a manner similar to that of lay-people. Specifically, these authors hypothesised that, in relation to crime scenarios, an internal attribution condition would be more associated with higher ratings of dangerousness and offender responsibility than would an external condition. As expected, they found little difference between a group of clinicians and a group of lay-people in their ratings of dangerousness and perceived responsibility; and they proposed these findings as further evidence that clinicians have no special expertise in this violence risk assessment context. However, this claim is dubious owing to potential problems with the sample used in the study. For instance, of the 24 clinicians who took part in this study, only 16 had previous clinical experience with offenders. Furthermore, in relation to the 16 subjects with offender experience, the authors did not state the precise nature of or length of time of this experience. In addition, the sample contained 3 psychiatrists and 21 psychologists but only 14 of the latter possessed doctorates. Therefore, the findings may have been confounded by a lack of *real* expertise on the part of the clinicians and, perhaps, some of the expert sample might have been more fairly described as *semi-experts.*

The question is: without these potential sampling limitations, might the clinicians have demonstrated specific evidence of their expertise? To shed light upon this issue, it may be useful to draw on some of the literature that has focused on the quality of judgement in different domains of expertise.

As discussed by Thomson, Onkal, Avcioglu and Goodwin (2004), any examination of expert judgement should consider the concept of expertise itself. Generally, experts are considered to have particular qualities that permit them to outperform non-experts on relevant tasks. We depend upon experts to influence and shape important policies that affect our lives; in the context of violence risk assessment this reliance is of paramount importance. Nevertheless, as discussed by Rowe and Wright (2001, p.342), “…it may be that the title of “expert” is conferred on those who hold particular roles rather than the basis of the known accuracy of their judgements.” Clearly, for the label of “expert” to be justified, it is vital that those who possess it can outperform those who do not on a relevant task. Unfortunately, it is not always practically possible to assess the quality of performance objectively.

According to Bolger and Wright (1994), practitioners are likely to perform well when both *ecological validity* (i.e., when the task is relevant to the expertise of the subjects) and *learnability* (i.e., when adequate and usable feedback is available in the domain under examination) are high. But if either one of these constructs is low, performance is predicted to be poor. It would therefore be foolish to anticipate performance differences between practitioners and those with no experience in the task domain when both of the constructs are low (Bolger & Wright, 1994).

In order to generate ecological validity, the experimental task must closely resemble the actual one executed by professionals in the workplace. It is possible for an experimenter, therefore, to establish high ecological validity via careful design of the study. Bolger and Wright (1994) suggested, however, that the level of the second construct, *learnability*, is dependent on the type of performance feedback that is available in the domain under consideration. The authors found that expert performance is typically good in domains where rapid and unambiguous feedback is available (e.g., horse racing) but is often poor in domains where such feedback is lacking (e.g., stock price forecasting). This would imply that in some domains it is practically impossible for practitioners to perform well. However, Thomson *et al.* (2004) have argued that, when predictions are concerned with rare events that occur at irregular intervals (such as someone committing murder after being released from a mental institution), learnability can be facilitated in other ways. These authors argued that experts can learn from detailed investigations of such events and the publication of the results of these investigations. In this manner the causes of events will be fed back to the population of experts, who, in turn, are likely to increase their levels of expertise over time with the experience of more investigations.

The present research directly compared the responses of experts, semi-experts and lay-people to crime scenarios with internal and external conditions. To avoid the potential sampling problems discussed above, careful attention was given to the allocation of participants to particular categories of expertise, as detailed later. The present study also attempted to ensure ecological validity by basing the scenarios on actual cases and by having two independent clinicians judge their contents in terms of the type of information practitioners typically receive to formulate their assessments.

As there is little agreement within the literature to support or deny the accuracy of clinician judgment in violence risk assessment, predictions of experimental outcome were deemed unsuitable and the following research questions were formulated:

1) Would experts be less subject to attributional manipulations, in terms of their perceived ratings of dangerousness, than semi-experts or lay-people?

2) Would experts be less subject to attributional manipulations, in terms of their assessments of offender responsibility, than semi-experts or lay-people?

**Methodology**

**Design**

The present research implemented a 3x3x2 mixed groups design, with the variables: expertise (experts, semi-experts, lay-people), crime type (murder, assault, armed robbery) and scenario manipulation (internal and external attribution). The independent variables were the participants’ level of clinical expertise and the internal/external scenario manipulations. The dependant variable was the participants’ responses on the questionnaires given.

**Participants**

The lay-person group consisted of 22 individuals (7M; 15F), aged 18-62 years (mean 33.5). The mean time spent in education within this group was 15.3 years. None of the participants within this group had received any training in psychiatry or psychology, or were involved in legal practice, correctional or health related occupations.

The semi-expert group consisted of 21 individuals (3M; 18F), aged 21-48 years (mean 28.4). Eleven were undertaking a Masters level degree in forensic psychology, eight were working as trainee psychologists and eight were working as assistant psychologists. The mean time spent in education within this group was 17.7 years. Twenty of these participants were currently involved in correctional or health related occupations. None of these participants were involved in legal practice but all had basic experience of violence risk assessment.

The expert group consisted of 12 individuals (5M; 7F), aged 28-61 years (mean 41.8), eight of whom were clinical/forensic psychologists, two were psychiatrists and two were forensic practitioners - the latter two participants had extensive practical experience in the process of conducting violence risk assessment in practice, despite not having a doctorate qualification. All participants within this group had at least five years of clinical experience and were highly familiar with the task of conducting violence risk assessments. The mean time spent in education within this group was 20.2 years.

**Apparatus**

Nine one-page crime scenarios were developed based on actual case notes, interviews and supplemented with information on specific offender characteristics (see Grant, Won Kim & Brown, 2001; Normandeau, 1972; Quinsey & Cyr, 1986). An internal and external manipulation of each of the nine scenarios was created. Three specific types of violent crimes were chosen for use in the scenarios created in the present study: murder, assault and armed robbery. Previous acts within the internal manipulations were designed to be similar to those described in the external manipulations in order to maintain consistency between the internal and external versions of scenarios.

Scenarios were randomly assigned to participants using a random number generator program (Haahr, 2008). Participants received one version of each scenario, either the external or internal version. Each scenario began with a descriptive paragraph of the stimulus individual’s pre-offense history and background. Typically included were: previous offences, work related history, family history, economic background, current relationship status, age and gender. All stimulus individuals were male. For each crime type, a scenario was written involving stimulus individuals aged 18, 30 and 52 years. This section was followed by one detailing the current crime and outcome to the victim. A questionnaire was given whereby participants were asked to recommend a suitable sentence length and to complete five 5-point rating scales that measured: seriousness of crime, dangerousness to others and dangerousness to self, the probability that the offender would benefit from psychological/psychiatric help and the offenders’ level of responsibility in the crime scenario.

McAuley, Duncan and Russell’s (1992) Revised Causal Dimension Scale (CDSII) was employed after each scenario and questionnaire in order to assess the effectiveness of the attributional manipulations. The items within the CDSII yield four causal dimensions: locus of causality, external control, stability and personal control. The statistical program *SPSS* Version 16 was used for data analysis.

**Procedure**

Participants were given a pack consisting of an information sheet, a consent form, participant instructions, nine crime scenarios and nine corresponding questionnaires. These questionnaires were placed after each crime scenario and the contents of the questionnaires remained constant for each scenario. Participants were asked within the instructions to treat scenarios as individual cases, and answer the corresponding questionnaire before moving onto the next scenario. Upon completion of the task participants were debriefed and thanked for their participation.

**Results**

The effectiveness of the attributional manipulations were analysed by means of a 3x2 unrelated analysis of variance for each of the CDSII dimensions, with the independent variables: expertise (expert, semi-expert, lay-person) and scenario manipulation (internally or externally attributed). Significant differences between the internal and external manipulations were demonstrated across all four dimensions, indicating successful scenario manipulation. As expected following the logical internal-external design of the scenarios, Locus of Control (F=118.46, df=1, 462, p<0.001), Stability (F=42.39, df=1,455, p<0.001) and Personal Control (F=9.23, df=1, 462, p=0.003) were rated higher in the internal scenario manipulations than in the external ones and External Control was rated higher in the external manipulations than in the internal ones (F=36.98, df=1,453, p<0.001). These findings indicate that individuals depicted in the internally manipulated scenarios were considered to be more in control of their situation and more stable than those depicted in the external manipulations.

In order to test the main variables of interest (i.e., sentence length, seriousness of crime, dangerousness of the offender to others and to self, the probability that the offender would benefit from psychological help, and the offenders level of responsibility for the crime) data for each of the variables were analysed by means of a 3x3x2 ANOVA, with the independent variables: expertise, scenario manipulation, and crime type (assault, murder, armed robbery).

A significant main effect of scenario manipulation was present in the judgments of seriousness of crime (F=9.81, df=1, 472, p=0.002), dangerousness of the offender to others (F=85.85, df=1, 470, p<0.001), offender level of responsibility (F=33.72, df=1, 465, p<0.001) and dangerousness of the offender to self (F=4.16, df=1,456, p=0.042), with higher ratings given in the internal manipulations for the first three of these variables and significantly higher ratings given in the external manipulations in the last.

A significant main effect of expertise was present in the ratings of seriousness of crime (F=4.49, df=2, 472, p=0.012), offender responsibility (F=4.75, df=2, 465, p=0.009), and the belief that the offender would benefit from psychological help (F=6.52, df=2, 470, p=0.002). As illustrated in Table 1, experts rated seriousness of crime as higher overall than both semi-experts and lay-people, with lay people rating the seriousness of crime lowest across the three groups. Those participants in the expert and semi-expert groups rated offender responsibility at approximately equal levels, with lay-people providing the highest assertions of offender responsibility. Experts rated the likelihood of offenders benefitting from psychological help lower than both the semi-expert group and the lay-person group, with lay-people again providing the highest ratings in support of this assertion.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Variable* | *Level of Expertise* | *Mean* | *SD* | *Minimum* | *Maximum* | *N* |
| Seriousness of Crime | Expert | 4.18 | 0.85 | 2 | 5 | 96 |
| Semi-Expert | 4.08 | 0.81 | 2 | 5 | 188 |
| Lay-person | 3.87 | 1.09 | 1 | 5 | 198 |
| Offender Responsibility | Expert | 4 | 0.97 | 1 | 5 | 96 |
| Semi-Expert | 3.98 | 0.98 | 1 | 5 | 188 |
| Lay-person | 4.22 | 1.00 | 1 | 5 | 198 |
| Benefit from Psychological Help | Expert | 3.39 | 1.05 | 1 | 5 | 96 |
| Semi-Expert | 3.75 | 1.15 | 1 | 5 | 188 |
| Lay-person | 3.89 | 1.28 | 1 | 5 | 198 |

Table 1: Descriptive statistics relating to the significant main effect of expertise on the variables: seriousness of crime, offender responsibility, belief that the offender would benefit from psychological help.

Significant interactions were found to exist in the judgements of offender responsibility and the extent to which the offender was judged as dangerous to others. In the judgments relating to offender responsibility for the crime, a significant interaction between level of expertise and scenario manipulation was present (F=5.86, df=2, 465, p=0.003), indicating that the responses given by experts, semi-experts and lay-people were not equal across the internal/external scenario manipulations. In addition, a significant interaction between crime type and the internal/external scenario manipulations was present (F=8.99, df=2, 465, p<0.000) indicating that the judgments made in relation to the three crime types differed across the internal/external scenario manipulations. These interactions are illustrated in Figure 1.

Figure 1: Mean ratings for offender responsibility as a function of internal/external manipulation across crime type and level of expertise.

Offenders were seen to be more responsible in the internal manipulations than the external across all crime types and by all levels of expertise. Of particular interest is the interaction between the level of expertise and the scenario manipulations: while it can be seen that both experts and lay-people rated the offender as more responsible in the internal scenario manipulations than in the external ones, with this difference being of approximately equal measure, the semi-experts presented only a very slight difference in judgments of offender responsibility across the internal/external manipulations.

As with ratings of offender responsibility, significant interactions between level of expertise and scenario manipulation (F=3.49, df=2, 470, p=0.031), and between crime type and the internal/external scenario manipulations (F=11.09, df=2, 470, p<0.000) were present in the judgements of offender dangerousness to others, as shown in Figure 2, below.

Offenders were considered to be more dangerous to others in the internal manipulations than in the external across all crime types and by all levels of expertise. It can once again be seen that both experts and lay-people rated the offender as more dangerous to others in the internal manipulations than in the external ones to an approximately similar degree. As before, the differences between the semi-expert’s judgments of dangerousness across the two scenario manipulations are much less than those of the other two groups.

Figure 2: Mean ratings for offender dangerousness to others as a function of internal/external manipulation across crime type and level of expertise.**Discussion**

Of key concern in the current research was the effect of attributional manipulation on the judgments made by experts, semi-experts and lay-people. The research questions relating to whether experts would be less subject to attributional manipulations, in terms of their perceived ratings of dangerousness, than semi-experts or lay-people and whether experts would be less subject to attributional manipulations, in terms of their assessments of offender responsibility, than semi-experts or lay-people, were formulated, based on Quinsey and Cyr’s (1986) findings. In addressing these issues, the present research found that offenders were considered to be more dangerous to others in the internally manipulated scenarios than in the externally manipulated ones across all levels of expertise. However, significant differences were found to exist between the three levels of expertise. Smaller differences in judgments of dangerousness between the internal/external manipulations were produced by the semi-expert group than was the case with the experts and lay-people; both experts and lay-people demonstrated similar patterns of judgment in assessing offender dangerousness. In a similar pattern to the findings surrounding the level of offender dangerousness, participants across all three levels of expertise considered the individuals depicted in the internal scenarios to be more responsible for their crime than their externally manipulated counterparts. Again, distinct similarities were present in the expert and lay-person judgments, with the semi-expert group once again showing marked differences from the experts and lay people, with only a 0.093 difference in the ratings of responsibility between the internal and external manipulations being present in this group.

These findings support those of Quinsey and Cyr (1986), in that they demonstrate marked similarities in expert and lay-person judgment. However, the most surprising result relates to the observation that the semi-expert group produced judgments distinctly less affected by the manipulated information. These findings highlight the importance of adhering to distinct group classification when investigating the role of expertise in judgments of violence risk assessment, having uncovered a distinct level of expertise in terms of judgments made (i.e., the semi-expert group) in comparison to traditional expert/lay-person comparisons. This finding may indeed hold important clues for improving expert judgment in violence risk assessment practice: by identifying what is distinct about the semi-expert group in comparison to experts and lay-people, it may be possible to decrease attribution error in expert judgment via targeted training. Chen, Froehle and Morran (1997) found that trainee counselors who participated in training sessions designed to instruct in attribution processes and practice empathetic perspective showed significantly lower dispositional bias (i.e., they blamed the cause of presenting problems less on internal factors) than those within a control condition. These findings in conjunction with those of the present research indicate that ongoing training focusing on better decision making may be the key to improving judgments and decision making in violence risk assessment practice.

Risk assessment, as previously discussed, is a notoriously difficult task (Doctor, 2004), with clinicians having to make judgments and decisions under pressures of time and workload, and under conditions of relative uncertainty (Dixon & Oyebody, 2007). The use of heuristics and causal attributions in judgment and decision making is an evolved system, designed to reduce cognitive load while minimizing error. While the use of such cognitive shortcuts usually produces adequate solutions to everyday problems, a number of errors can arise through their use, impeding judgment. The present research highlights this issue: in presenting intentionally manipulated information, with static factors (e.g., gender, age, race) maintained across both the internal and external manipulations of each scenario, the researchers were able to elicit distinct differences in judgments of seriousness of crime, offender dangerousness to both self and others and the offender’s level of responsibility for the crime.

While the current findings may suggest that experts in violence risk assessment are no different than lay-people in terms of judgments relating to violence risk assessment, as has been the previous assertion in the literature, they may also indicate that while experts in violence risk assessment may be making what would appear to be biased judgments, they may in fact be making assessments based on dynamic risk factors (i.e., those factors affecting risk of violence that are changeable over time). Recent research has indicated that these dynamic factors are just as important as the more classically considered static risk factors (Elbogen, Van Dorn, Swanson, Swartz & Monahan, 2006). Thus, while the current findings would appear to suggest that experts demonstrate no specific skill in comparison to lay-people and that semi-experts are less prone to attributional manipulation, they may, conversely, be indicative of the different processes occurring in the different levels of expertise. That is, the use of ‘untrained’ cognitive shortcuts at the lay person stage, the reduction in the reliance on heuristic decision making co-occurring with ongoing training at the semi-expert level, and the apparent return to the use of cognitive shortcuts in judgment at the expert level. This return to the use of cognitive shortcuts may indeed only be ‘apparent’, with the individual having honed such a level of expertise in the area to identify and weigh the risk of violence based on not only the more commonly identified static factors (as would perhaps be the main factors assessed at the semi-expert level), but also on the dynamic factors associated with risk of violence.

In order to identify why consistent similarities between expert and lay-person judgment in violence risk assessment are found where the semi-expert level of expertise appears distinct, and whether the apparently less biased judgments produced by this latter group serves as a positive or negative function in violence risk assessment, a greater level of research into these issues must be conducted. In order to address these issues, replicatory research and research investigating the predictive accuracy of decisions made across the three distinct levels of expertise investigated in the current research must be conducted. In addition, qualitative investigations into the process of judgments made in relation to violence risk assessment would be beneficial in identifying the distinct skills and possible weaknesses in judgment present across experts, semi-experts and lay-people.

The current findings highlight the complexity of the decision making processes involved in violence risk assessment and lend support to Quinsey and Cyr’s (1986) original findings relating to causal attributions in clinical judgment. However, through expanding and clarifying the levels of expertise investigated, the current findings have highlighted an important and distinct difference in the effects of causal attributions on varying levels of expertise. These findings emphasize the need for greater research into not only expert and lay-person judgments, but also into the distinct semi-expert group, in order to further our understanding of violence risk assessment across the varying stages of clinical expertise.

**References**

Bolger, F. & Wright, G. (1994). Assessing the quality of expert judgement. *Decision Support Systems,* **11**, 1-24.

Bonta, J., Law, M. & Hanson, K. (1998). The prediction of criminal and violent recidivism among mentally disordered offenders: A meta-analysis. *Psychological Bulletin*, **123**, 123-142.

Chapman, L. & Chapman, J. (1967). Genesis of popular but erroneous psychodiagnostic observations. *Journal of Abnormal Psychology*, **72**, 193-204.

Cooke, D. J., Michie, C. & Ryan, J. (2001). *Evaluating risk for violence: a preliminary study of the HCR-20, PCL-R and VRAG in a Scottish prison sample*. Scottish Prison Service Occasional Paper Series 5/2001.

Chen, M., Froehle, T. & Morran, K. (1997). Deconstructing dispositional bias in clinical inference: Two interventions. *Journal of Counseling and Development*, **76**, pp.74-81.

De Vogel, V. & De Ruiter, C. (2004). Differences between clinicians and researchers in assessing risk of violence in forensic psychiatric patients. *The Journal of Forensic Psychiatry and Psychology*, **15**, 145-164.

Dixon, M. & Oyebody, F. (2007). Uncertainty and risk assessment. *Advances in Psychiatric Treatment*, **13**, 70-78.

Doctor, R. (2004). Psychodynamic lessons in risk assessment and management. *Advances in Psychiatric Treatment*, **10**, 267-276.

Elbogen, E. B., Van Dorn, R. A., Swanson, J. W., Swartz, M. S. & Monahan, J. (2006). Treatment engagement and violence risk in mental disorders. *British Journal of Psychiatry*, **189**, 354-360.

Gardner, W., Lidz, C. W., Mulvey, E. P. & Shaw, E. C. (1996). Clinical versus actuarial predictions of violence in patients with mental illness. *Journal of Counselling and Clinical Psychology*, **64**, 602-609.

Goldberg, L. R. (1959). The effectiveness of clinicians’ judgments: the diagnosis of organic brain damage from the Bender-Gestalt test. *Journal of Consulting Psychology***, 23**, 25-53.

Grant, J. E., Won Kim, S. & Brown, E. (2001). Characteristics of geriatric patients seeking medication treatment for pathologic gambling disorder. *Journal of Geriatric Psychiatry and Neurology*, **14**, 125-129.

Haahr, M. (2008). *Random.org: True Random Number Service* [Online]. Available: <http://www.random.org> [15 March 2008].

Hall, G. C. N. (1988). Criminal behavior as a function of clinical and actuarial variables in a sexual offender population. *Journal of Consulting and Clinical Psychology*, **56,** 773-775.

Hassin, Y. (1986). Two models of predicting recidivism: Clinical versus statistical –another view*. British Journal of Criminology*, **26,** 270-286.

Holland, T. R., Holt, N., Levi, M. & Beckett, G. E. (1983). Comparison and combination of clinical and statistical predictions of recidivism among adult offenders. *Journal of Applied Psychology*, **68,** 203-211.

Litwack, T. R. (2001). Actuarial versus clinical assessments of dangerousness. *Psychology, Public Policy and Law,* **7(2),** 409-443.

Litwack, T. R., Zapf, P. A., Groscup, J.L. & Hart, S.D. (2006). Violence risk assessments: Research, legal, and clinical considerations. In I. B. Weiner and A. K. Hess (Eds), *The handbook of forensic psychology,* New York: Wiley and Sons, Inc.

McAuley, E., Duncan, T.E., & Russell, D. W. (1992). Measuring causal attributions: The revised causal dimension scale (CDSII). *Personality and Social Psychology Bulletin*, **18(5)**, 566-573.

McMillan, D., Hastings, R. P. & Coldwell, J. (2004). Clinical and actuarial prediction of physical violence in a forensic intellectual disability hospital: A longitudinal study. *Journal of Applied Research in Intellectual Disabilities*, **17,** 255-265.

Monahan, J. (1984). The prediction of violence behaviour: Toward a second generation of theory and policy. *American Journal of Psychiatry,* **141,** 10-15.

Normandeau, A. (1972). Violence and robbery: A case study. *Acta Criminologica*, **5(1)**, 11-106.

Quinsey, V. L. & Cyr, M. (1986). Perceived dangerousness and treatability of offenders: the effects of internal versus external attributions of crime causality. *Journal of Interpersonal Violence*, **1**, 458-471.

Quinsey, V. L., Harris, G. T., Rice, M. E. & Cormier, C.A. (1998). *Violent offenders: Appraising and managing risk.* American Psychological Association.

Quinsey, V. L. & Maguire, A. (1986). Maximum security psychiatric patients: Actuarial and clinical predictions of dangerousness. *Journal of Interpersonal Violence*, **1,** 143-171.

Rowe, G. & Wright, G. (2001). Differences in experts and lay judgements of risk. *Risk Analysis*, **21(2),** 341-356.

Smith, J. & Lanyon, R. I. (1968). Predictions of juvenile probation violators. *Journal of Consulting and Clinical Psychology*, **32,** 54-58.

Steadman, H. J. & Cocozza, J. J. (1974). *Careers of the criminally insane: Excessive social control of deviance.* Lexington, MA: Lexington Books.

Thomson, M. E., Onkal, D., Avcioglu, A. & Goodwin, P. (2004). Aviation risk perception: A comparison between experts and novices. *Risk Analysis,* **24(6),** 1585-1595.

Wormith, S. J. & Goldstone, C. W. (1984). The clinical and statistical prediction of recidivism. *Criminal Justice and Behavior*, **11**, 3-34.