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Psychometric Analysis of the Adolescent Decision-Making Questionnaire

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Abstract

The Adolescent Decision-Making Questionnaire has been widely used to measure adolescent decision-making behaviors throughout the world. Though psychometric properties are mentioned as it is used in individual studies, there is a need for critical review of its use and value in research. This article offers a critical review of the characteristics and psychometric properties of the Adolescent Decision-making Questionnaire and evaluates the strengths, weaknesses, and gaps in the literature related to this instrument.

Keywords: Adolescent, Decision, Decision-Making, Questionnaire, Mann, Instrument, Psychometric, ADMQ

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"It's in your moments of decision that your destiny is shaped".[1] Throughout the years, adolescents' decision-making behaviors have been deemed hormonal, risky, and disruptive while society's views on influences of adolescent decision-making behaviors are shifted among social upbringing, peer influences, environments, and biological factors.[2] Despite the varying beliefs on adolescent decision-making behaviors, it is evident that negative decision-making behaviors often lead to less than optimal health, economic, and social destinies for adolescents. Therefore, further research is needed to identify interventions to improve the adolescent decision-making behaviors.

Adolescent decision-making is a behavioral concept which "tend[s] be relatively abstract;"[3p23] however, measurement is effective through observation or self-report. Decision-making behaviors and associated concepts are often not directly observed, and therefore self-report measurement provides "the most direct approach to the determination of affect."[3p10] This article evaluates the Adolescent Decision-Making Questionnaire (ADMQ) and psychometric properties including: a) its theoretical history, conceptual development, and present state; b) measures of reliability and validity; c) uses of the ADMQ; d) appropriate statistical methods for analysis; e) sampling; f) feasibility and usefulness; g) revisions of the instrument; h) responsiveness; and i) strengths and weaknesses of the instrument.

The ADMQ was derived from the Flinders Decision-Making Questionnaires I and II (DMQ) and adapted for adolescents.[4,5] Psychometric properties including test-retest, internal reliability, and high levels of validity for the DMQ have been well-established.[6-8] The ADMQ assesses the concept of decision-making self-esteem and also measures four concepts related to coping: a) vigilance, b) complacency, c) panic, and d) cop out.[9] The final concept of cop out is subdivided into three categories: a) defensive avoidance, b) put it off, and c) pass it on. Evasiveness is a term used in conjunction with cop out as a combined concept in some literature, but is not utilized by the original tool. The self-report instrument uses a 30-item, 4-point Likert scale and includes 6 self-confidence items and 24 decision-making items. In this summated rating scale, response choices include: a) not at all true for me, b) sometimes true, c) often true, and d) almost always true. Higher scores related to vigilance indicate confidence and better decision-making behaviors; while scores related to complacency, panic, and cop outreflect poor decision-making behaviors and are termed maladaptive coping behaviors.[9] Using the subscales, the ADMQ can be used to measure both positive and negative decision-making behaviors, and has a strong theoretical basis to support the measurements of the instrument.

Theoretical History, Conceptual Development, and Present State

The theoretical basis of the ADMQ was designed using Janis' and Mann's conflict model of decision-making (CMDM) which originated in 1977.[10]Copyrighted in 1985, the ADMQ measures concepts similar to those of the theoretical model designed by Janis and Mann (1977). The CMDM utilizes principles and concepts from Bandura's social learning theory and social cognitive theory, as well components of Lewin's field theory.[11] Concepts include choice, commitment, stress, decision-making, styles of coping, consequences, and decisional balance. In the CMDM, two groups of coping styles exist: adaptive and maladaptive.[12] Adaptive coping styles include vigilance, while the maladaptive category includes three coping styles identified as: a) complacency, b) cop out, and c) panic.[12,13] The ADMQ measures all levels of both adaptive and maladaptive patterns of coping directly.

Janis and Mann speculated that if conflict derives from decision-making, then stress and coping must occur.[12] "The experience of stress was related to concern about losses that might accompany a particular decision or concern about decreases in self-esteem or personal reputation if the decision turned out to be wrong".[11p288] Additionally, the CMDM predicts that individuals who use adaptive coping patterns in decision-making are more likely to have higher self-esteem and confidence related to decision-making behaviors.[12,14] In order to measure the constructs with the CMDM, the ADMQ was developed to measure adolescent decision-making behaviors.

The theoretical background, reliability and validity of the instrument, and design of the tool have led to the wide use of the ADMQ. In a review of the literature, 11 studies identified psychometric properties of the ADMQ.[4-6,9,13] [16-21] The ADMQ originates from the decision-making course, titled GOFER (**G**oals clarification, **O**ptions generation, Fact-finding, consideration of **E**ffects, **R**eview and implementation), targeted to high school students and the conflict theory of decision-making. While a theoretical basis provides a foundation for instrumentation development, measurement reliability and measurement validity are needed.

Reliability

"The importance of reliability for research methods cannot be overstated."[15p311] Information on several aspects of reliability of the ADMQ are available in the literature. Temporal stability, or test-retest, reliability is not discussed for the English version of the ADMQ, but has been offered for the Hebrew version at a level of 0.64.[6] Though parallel forms measurement for reliability are not mentioned, a second version of the ADMQ has been established.[16] The alternate version of the ADMQ offers fewer items (from 30 to 22), but does not offer complete congruence with concepts. The original ADMQ measures five concepts, but the alternate version measures only four concepts, with different factor loadings from the

original instrument. Regarding internal consistency,[15] the Cronbach's alpha reported for various concepts of the ADMQ are as follows: a) decision-making self-esteem (0.76), b) vigilance (0.70), panic (0.70), complacency (0.67) and cop out (0.80).[9] Moderately acceptable values are greater than 0.60, while high values are greater than or equal to 0.80.[15] Most studies using the ADMQ report Cronbach's alpha values ranging from 0.52 to 0.81.[6,13,17-20]

Validity

Based on the author's evaluation, the ADMQ appears to have face validity and be appropriate for measuring adolescent decision-making. In addition, it appears to be at an acceptable reading level and that the terms are appropriate for adolescent language, speech, and grammar. Content validity is also present in the tool. The conflict theory of decision-making accommodates each component of the tool and what actions or thoughts might occur for decision-making self-esteem and coping styles for decision-making.[12]

Criterion related validity for the ADMQ has been measured and established through concurrent evidence with contraceptive behavior use, gambling, comparison to other decision-making behavior tools, and in comparisons among some demographic variables.[21] Convergent validity of the ADMQ is not discussed in the literature.

"When applying construct validity to an instrument, there is a requirement that the construct that the instrument is measuring is guided by an underlying theory."[15p323] The ADMQ is developed directly from the conflict theory of decision-making by Janis and Mann. Throughout the research using the ADMQ, two hypotheses have been evident: 1) younger adolescents would score higher on maladaptive coping and lower on vigilance and decision-making self-esteem, and 2) vigilance and decision-making self-esteem would be associated with higher levels of decision-making and decision-making behaviors, implying convergent evidence, which has been consistently confirmed.[4-6,9,13] [16-21] Regarding discriminant evidence for construct validity, it is not discussed, nor are specific factor analyses, for the original ADMQ, but are found for the alternate version.[16]

Method: Use of the ADMQ, Statistical Methods, and Research Sampling

A review of the literature was performed using computerized databases. To identify articles for the review, a search of PubMed and Ebsco Premier databases was conducted using key terms such as adolescent decision making questionnaire, ADMQ, Mann, and decision making. Articles included in the review utilized the ADMQ and incorporated

reported psychometric properties within the timeframe of 1985 to December 2009. The search yielded 11 articles that met the inclusion criteria. The search also yielded several articles that reported psychometric properties of the Flinders Decision-Making Questionnaires I and II, the instruments from which the ADMQ was developed.

The ADMQ is widely utilized in current research. Commendador[13] used the ADMQ with measurements of self-esteem and contraceptive behavior among 98 female adolescents in Hawaii, showing a significant negative correlation between maladaptive decision-making behaviors and contraceptive usage. Concepts of the ADMQ were tested for reliability, although maladaptive decision-making concepts were combined into one category. Cronbach's alpha and means, respectively, were reported as follows: a) decision-making self-esteem (0.70, 12.19), b) vigilance (0.70, 10.29), c) complacency, panic, and cop out (0.827, 14.71).[13] Statistical measures used included Pearson correlations and logistic regression.

The ADMQ has also been used to examine relationships among decision-making behaviors, self reported personality traits related to consequences and rewards through a gambling simulation, impulsivity, and decision-making styles in a sample of 44 college students in psychology courses.[21] Although, Franken and Muris[21] reported use of the ADMQ, they used a revised 22-item version based on other research by Tuinstra, van Sonderen, Groothoff, van den Heuvel, and Post,[16] and offered different descriptions of the concepts including self-confidence, avoidance, impulsiveness, and panic. Reliability and validity were reported for previous studies, but there was no discussion of reliability and validity findings specific to their study. Though they expanded use of the tool on another population, generalizability is limited due to the absence of reliability and validity statistics, as well as the vague description of concept changes from the original work on the tool.

Other research utilizing the ADMQ has been examined by Mann and colleagues. For example, relationships between parents' and adolescents' confidence and competence in decision-making behaviors were compared.[18] Among 584 Australian high school students, younger adolescents' self-esteem was related to parents' decision-making self-esteem. Also, decision-making competence was associated for mothers and younger daughters.[18] Results were determined through measures such as ANOVA, Pearson correlations, and descriptive statistics. Decision-making self-esteem of the ADMQ yielded alphas ranging from 0.60 to 0.78, while the concept of vigilance yielded alphas of 0.71 to 0.77.[18] Reliability and validity statistics for other concepts included in the ADMQ were not reported.

Other researchers examined the relationship between culture and decision-making self-esteem, decisional stress, and self reported decision coping styles using a modified form of the ADMQ among 950 university students from Australia and Japan.[17] Although the ADMQ was modified, this was not discussed, though a pilot study was mentioned with no details given.[17] Data analysis included descriptive statistics and correlations. Cronbach's alpha results were reported for the total sample (-0.77), Australian students separately (-0.79), and Japanese students separately (-0.73).[17] Cronbach's alphas were also reported for each subscale of the ADMQ for the total sample, Australian students, and Japanese students, respectively: a) complacency (-0.68, -0.67, -0.57) and b) avoidance (-0.79, -0.79, -0.77).[19] Results of the study demonstrated that cultural differences are present in decision-making behaviors; Japanese students had higher scores on decisional stress, complacency, avoidance, and hyper-vigilance, also described as panic, while scoring lower on decisional self-esteem.[19]

Similarly, in another study, researchers compared decision coping patterns between Israeli and Australian adolescents.[6] In the study, 1028 ninth graders from Israel and 428 Australian students with unidentified grades were randomly selected. The ADMQ was translated into Hebrew and demonstrated a test-retest reliability of 0.64 using 42 students and retesting after 11 days.[6] "Reliability measured using Cronbach's alpha procedure was 0.78 for the whole scale, and 0.59-0.65 for subscales."[6p191] Pearson correlations, smallest space analysis, and MANOVA were used to analyze data. Significant differences between Israeli and Australian adolescents were noted, with Israeli adolescents scoring higher on self-confidence, vigilance, and lower on cop out.[6]

Other research has measured and compared meta-cognitive knowledge of decision-making and self-reported decision-making for younger and middle age adolescents.[20] In a sample of 84 students, middle adolescents scored significantly better on decision-making self-esteem and vigilance than younger adolescents on the ADMQ. Younger adolescents scored higher on the maladaptive behaviors associated with poorer decision-making. Males scored significantly higher on decision-making self-esteem than females.[20] Reliability coefficients were reported for decision-making self-esteem (0.81), vigilance (0.52), and the maladaptive factors including complacency, panic, and cop out (0.81).[20] Data analyses included ANOVA, t-test, correlations, and descriptive statistics. In addition to scholarly pursuits, the ADMQ has been used in evaluation of experiential learning curriculum materials.[22]

Revisions of the ADMQ and Psychometric Properties

In other research, a random sample of 1,642 Dutch adolescents in secondary education institutions was used to evaluate the ADMQ for reliability, validity, and structure.[16] A cross validation study was also completed with random assignment to groups. Cronbach's alpha and inter-item correlation for the experimental group were reported respectively for each concept: a) self confidence (decision-making self-esteem) (0.63, 0.22), b) vigilance (0.55, 0.17), c) panic (0.64, 0.31), d) evasiveness/cop out (0.65, 0.24), and e) complacency (0.59, 0.15). Concerns for these results might include modified definitions and items included for the concepts complacency and panic. The original tool offers six items per concept, but in this research, panic was identified by four items, and complacency used eight items. Further, two items were misplaced in the study, potentially skewing results.

Also, principle component analysis (PCA) and simultaneous component analysis (SCA) were preformed, indicating that 12 of the 30 original items did not load on the intended factor. Results demonstrated that with the original model only 36.1% of the variance was explained, but that with restructuring of the tool, 39.2% was possible. Eight items were removed from the original tool. Omission was determined based on low factor loadings (<0.40), an increase in internal consistency when removing items, and discrepancy of content related to other items. Based on this work, a revised ADMQ was created with four subscales and only 22 items. After the revision, the factor loadings were examined and renamed based on items that loaded. The new factors identified and associated Cronbach's alpha and inter-item correlations for both the experimental and control groups, respectively were: a) avoidance (0.72, 0.30) (0.71, 0.29), b) self-confidence (0.70, 0.28) (0.70, 0.28), c) panic (0.65, 0.27) (0.64, 0.26), and d) impulsive and thoughtless (0.60, 0.25) (0.59, 0.23). PCA and SCA were conducted using the items to be included in the revised version for both the control and experimental groups resulting in comparable results for both groups. With the revised instrument, 41.8% of the possible 43.1% variance is explained.[16]

Construct validity was further explored with convergent and discriminant evidence in relation to peer group pressure. Significant, but weak, correlations ($\rho<0.001$) were found between peer group pressure and avoidance (0.27), panic (0.19), and impulsive and thoughtless (0.14), although no correlations were shown between self confidence and peer group pressure.[16] Other significant correlations ($\rho<0.001$) between items were demonstrated such as impulsive and thoughtless and the categories of avoidance (0.24) and self confidence (-0.17). Additionally, impulsive and thoughtless were significantly correlated ($\rho<0.01$) with panic ($r = 0.08$). The category of panic was shown to be significantly moderately correlated ($\rho<0.001$) with avoidance ($r = 0.41$) and self confidence ($r = -0.29$), while self confidence was also correlated with avoidance (-0.33).[16] Limitations of the revised ADMQ include: a) possible loss of meaning during translation, b) cultural differences and meanings of terms, c) variability in adolescent development between cultures, and d) variance in items and concepts congruence between the theoretical model and the revised instrument.

Responsiveness

The ADMQ has been used primarily as a measurement or an evaluation tool, but seldom used a measurement of change, except to detect change among demographic variables, such as culture, sex, and age. Further longitudinal studies might provide insight into change and the sensitivity and specificity of the instrument.

Sensitivity and specificity of the instrument are not reported explicitly in the literature. Sensitivity measures indicate correctly identified positives, whereas specificity measures show correctly identified negatives, preventing Type I and II errors respectively.[3] In relation the ADMQ, sensitivity would show the ability for the instrument to detect decision-making self-esteem, vigilance, and maladaptive coping styles in adolescents. Since the ADMQ is a self- report instrument, and the behaviors associated with decision-making are abstract, the results of the instrument are accepted as accurate. Specificity can be examined through standard deviations (SD) from the mean. In a study by Mann and colleagues (n=91), the mean for decision-making self-esteem for the treatment group was 9.5 with a SD of 2.76 versus the control group (7.6 +/- 2.58).[9] Means and SDs were also reported for the other concepts for treatment group: vigilance (9.97 +/- 3.01) and maladaptive coping styles (12.78 +/- 4.97), and the control group: vigilance (8.32 +/- 3.21) and maladaptive coping styles (19.21 +/- 6.64).[9] Due to the large standard deviations, specificity of the instrument may be limited.

Sampling and Data Collection Concerns

Only two studies that utilized the ADMQ were found to use random sampling techniques. While convenience sampling methods were not discussed specifically, it is implied in most studies using the ADMQ. Large sample sizes are abundant in the literature, with most large samples were among Australians, with the exception of one study in Hawaii and several studies comparing others cultures such those of Japan and Israel. Limitations to the research included limited geographic area of samples to include children in specific educational programs. Further, specific description of recruitment of adolescents was often not included. One study of adolescents and parents recruited the adolescents first, asking the adolescents to encourage their parents to participate.[18] Concerns of coercion and assent and consent are generally discussed among the studies.

Analysis Method Characteristics

For establishment of internal consistency, obviously the Cronbach's alpha is the acceptable statistical measure.[15,23] Cronbach's alpha has been tested for each subscale of the ADMQ: a) vigilance (0.73), b) complacency (0.73), c) panic (0.70), and d) cop out(0.66).[10] Inter-item correlations are not present for the original version of the ADMQ, but are given for the alternate version created by Tuinstra and colleagues.[16]

Strengths and Weaknesses

Strengths of the ADMQ include its wide usage and strong theoretical design by scholars in decision-making. Validity and congruence are established between the instrument and theoretical model, and enhanced by original concurrent development of both the model and the instrument. Cronbach's alpha statistics are prevalent among studies using the tool, and are moderate to high in most all cases. However, other statistics related to reliability and validity are largely absent.

Weaknesses of the instrument include limited availability of psychometric properties as well as few studies using random sampling when testing the instrument. Likewise, the majority of the research samples took place among countries outside of the United States, decreasing generalizability and creating possible cultural and language concerns. Generalizability is also limited based on the large number of students who completed the ADMQ in nested education settings, with few among such populations as those who might have chosen to drop out of school or take another life course. Other limitations include the actual literature available related to the ADMQ. Several unpublished manuscripts involving the ADMQ were cited in many articles, and thus not accessible for this review. It is possible that valuable information related to the ADMQ is included in those articles that might have affected the outcome of the review.

Feasibility Issues

The cost of the ADMQ is minimal, available through the author, and the revised ADMQ is included in the original publication.[16] Costs of implementation of the instrument are small and would be related to study design issues, such as incentives and administration time, though minimal for 30 items. Additional time and costs might be associated with testing the additional psychometric properties. In the literature, there are no required conditions for administration of the ADMQ. A scoring sheet accompanies the tool that is clear and concise. Each item is scored from 0 to 3; several items are reverse scored. Training for administrators is minimal. Finally, there is no required security of instrument above usual

practices of scientific integrity. Additionally, the readability and language of the ADMQ in English appears to be appropriate for adolescents.

Conclusions

The ADMQ is a useful instrument for many populations of adolescents. Scoring of the ADMQ is clear and concise. The instrument is scored on a Likert scale with ranges for each question from 0 to 3 with highest possible total score accumulating to 90 points for the total instrument. While cut-scores are not established, concepts are clearly delineated. Items on the ADMQ specifically measure each concept. Decision-making self-esteem, vigilance, complacency, and panic are each measured by six individual items with a summative range of 0 to 18. Cop out, which is divided into three categories, has two items that measure each subcategory with a summative range of 0 to 6, and an overall summative range of 0 to 18. Means and standard deviations are reported among the majority of studies. Higher scores related to decision-making self-esteem and vigilance are associated with adaptive coping styles, while higher scores on complacency, panic, and cop out are associated with maladaptive coping styles. Sensitivity and specificity are not determined for the ADMQ, but further research may provide this information.

While the ADMQ provides information to advance the science of adolescent decision-making, there remain some limitations to the use of the tool. Unpublished works may hold the key to the unanswered questions related to the psychometric properties associated with the ADMQ. Although there are limitations, the strengths of the instrument support its use to help to delineate adolescent decision-making behaviors and coping styles and offer opportunity to enhance decision-making for this population.

References

1. Robbins, A. (2009). *Quotes about decision-making*, Retrieved January 1, 2010: http://quotations.about.com/cs/inspirationquotes/a/DecisionMaki5.htm.
2. Cauffman, E. (2004). The adolescent brain: Excuse versus explanation*. Annals of the New York Academy of Sciences*, *102,* 160-161.
3. Waltz, C. F., Strickland, O. L., & Lenz, E. (2005). *Measurement in nursing and health research*. 3rd ed. New York: Springer.

4. Brown, J. E., & Mann, L. (1990). The relationship between family structure and process variables and adolescent decision-making. *Journal of Adolescence*, *13,* 25-37.
5. Mann, L., Radford, M., Burnett, P., Ford, S., Bond, M., Leung, K., Nakamura, H., Vaughan, G., & Yang, K. (1998). Cross-cultural differences in self-reported decision-making style and confidence. *International Journal of Psychology*, *33(5),* 325-335.
6. Friedman, I. A., & Mann, L. (1993). Coping patterns in adolescent decision-making: An Israeli-Australian comparison. *Journal of Adolescence*, *16(2,* 187-199.
7. Burnett, P., Mann, L., & Beswick, G. (1989). Validation of the Flinders decision-making questionnaire on course decision-making on students. *Australian Psychologist*, *24,* 285-292.
8. Radford, M. H., Mann, L., & Kalucy, R. S. (1986). Psychiatric disturbance and decision-making. *Australia and New Zealand Journal of Psychiatry*, *20,* 210-217.
9. Mann, L., Harmoni, R., Power, C., Beswick, G., & Ormond, C. (1988). Effectiveness of the GOFER course in decision-making for high school students. *Journal of Behavioral Decision-making*, *1(3),* 159-168.
10. National Network for Child Care. (1998). *Abstracts of assessments by topic: Decision-making measures*, Retrieved January 1, 2010: http://www.nncc.org/Evaluation/topic1.html#anchor42016267.
11. Rew, L. (2005). *Adolescent health: A multidisciplinary approach to theory, research, and intervention*. Thousand Oaks. CA: SAGE.
12. Janis, I.L., & Mann, L. (1977). *Decision-making: A psychosocial analysis of conflict, choice, and commitment*. New York: Free Press.
13. Commendador, K. (2007). The relationship between female adolescent self-esteem, decision-making, and contraceptive behavior. *Journal of the American Academy of Nurse Practitioners*, *19(11),* 614-623.
14. Mann, L., Harmoni, R., & Power, C. (1989). Adolescent decision-making: The development of competence. *Journal of Adolescence*, *12(3),* 265-278.
15. Gliner, J. A., & Morgan, G. A. (2000). *Research methods in applied settings: An integrated approach to design and analysis*. Mahwah, N. J.: Lawrence Erlbaum.
16. Tuinstra, J., van Sonderen, F. L. P., Groothoff, J. W., Heuvel, W. J. A. Van den, & Post, D. (2000). Reliability, validity, and structure of the adolescent decision-making questionnaire among adolescents in The Netherlands. *Personality & Individual Differences*, *28,* 273-285.
17. Radford, M.H., Mann, L., Ohta, Y., & Nakane, Y. (1993). Differences between Australian and Japanese students in decisional self-esteem, decisional stress, and coping styles. *Journal of Cross-Cultural Psychology*, *24(3),* 284-297.

18. Brown, J. E., & Mann, L. (1991). Decision-making competence and self-esteem: A comparison of parents and adolescents*. Journal of Adolescence*, *14(4),* 363-371.
19. Bosma, H. A., & Jackson, S. E. (1996). Who has the final say? Decisions on adolescent behaviour within the family*. Journal of Adolescence*, *19(3)*, 277.
20. Ormond, C., Luszcz, M. A., Mann, L., & Beswick, G. (1991). A metacognitive analysis of decision-making in adolescence*. Journal of Adolescence*, *14*(3): pp. 275-291.
21. Franken, I. H. A., & Muris, P. (2005). Individual differences in decision-making*. Personality & Individual Differences*, *39(5)*, 991-998.
22. Dimmitt, C. (2007), Report prepared for America's Career Resource Network. Amherst, MA: Center for School Counseling Outcome Research.
23. Polit, D. (1996). *Data analysis and statistics*. Upper Saddle River, NJ: Prentice Hall.