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PEER RANKING AS CRITERION MEASURE FOR INITIAL ACQUISITION OF TARGETS

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INTRODUCTION

Background

A critical element of tactical advantage for air combat is the early visual acquisition of airborne targets. Although no precise data exists, it appears that initial visual acquisition of airborne targets occurs at less than calculated visibility ranges. Further, anecdotal evidence from Naval Flight Officers (NFOs) and Fighter Pilots indicate that operational pilots do, in fact, vary in in-air acquisition performance and that "top" performers can be identified. This suggests that peer evaluation may serve as an initial criterion of initial acquisition performance.

A peer rating technique was investigated in this study. A common approach is the nomination procedure in which raters are required to choose, from among their peers, a specified number of peers who are "high" on some performance continuum and an equal number who are "low". This method is specially suited in situations where a large number of peers are available for rating. A second method of peer rating is a complete or partial ranking of peers. This method may be accomplished by several procedures such as a simple rank ordering of peers, alternative ranking or paired comparisons. Such methods are employed when relatively few peers are available for assessment.

A partial ranking technique was selected for this study. Structured interviews, with operational NFO and pilots, indicated that the aviation personnel were willing to rank "top" performers but were reluctant to rank peers at the bottom of the continuum.

Objective

The objective of this study is to test the assertion that NFO and fighter pilots have the ability to reach a reasonable consensus as to whom the "top" performers in initial target acquisition capability were.

METHOD

Subjects: Two F-4 fighter squadrons, located at Naval Air Station Miramar, San Diego, California, were selected for this study. These fighter squadrons are identified as squadron "A" and squadron "B" for the present study. Squadron "A" consisted of 12 NFOs and 15 pilots, while Squadron "B" had 14 NFOs and 15 pilots. Table I compares squadron "A" with squadron "B" in terms of military rank, mean number of months in squadron, and the mean number of operational tours for participants in this study.

Table I

Composition of Squadrons

Composition Element	Squadron "A" N	Squadron "B" N
Officer Rank		
ENS	3	1
LTJG	5	5
LT	5	7
LCDR	1	1
CDR	0	1
Average number of months in squadron.	12.5	14.2
Average number of operational tours.	.93	1.6

Peer Ranking Forms: Appendix A contains a sample peer ranking form. The wording and structure of this form was designed on the basis of information gathered during structured interviews with operational NDOs and pilots. This form provided the means for ranking pilots and NFOs by both respective groups in terms of initial visual target acquisition performance.

Form Administration: The Commanding Officers of squadrons "A" & "B" were contacted and briefed on the purpose of the study. A point of contact was estab-

lished for each squadron. Points of contact were requested to provide a roster for their respective squadron and to assist in the scheduling of squadron's NFOs and pilots for administration of the peer ranking forms. Arrangements were made to administer the forms prior to or immediately following flight briefs. All available NFOs/pilots from each subject squadron were requested to participate. Prior to each administration, the participants were: 1) briefed on the purpose of the study, 2) advised that information collected would be used exclusively for research purposes, (3) encouraged to question form's content, 4) requested to complete the form, and 5) asked not to discuss rankings with other squadron peers.

Data Analysis: NFOs and pilots from each squadron were listed on the form in rank order from most effective through fifth most effective in intial target acquisition. Peers ranked most effective were assigned a score of 5, second most effective a score of 4, and so on. A weighted sum for these rankings was calculated and rank order correlation coefficients were computed to determine the extent to which pilots and NFOs agreed in their rankings.

RESULTS AND DISCUSSION

Data presented in Table 2 indicate that NFOs and pilots reached consensus of opinion for "top" performers in initial visual target acquisition capability. To assist in data interpretation, analyses were conducted of individual confidence in their performance rankings. Sixty-four percent of squadron "A", and 73% of squadron "B", participants indicated medium to high confidence for their rankings. The average number of reported direct observations of acquisition performance ranged from 8 to 26 for squadrons "A" and "B".

Table 2

Correlation Coefficients Between NFO and Pilot Rankings

Squadron	NFO/Pilot Rankings of NFOs	NFO/Pilot Rankings of Pilots
"A"		
Pilot Rankers (N = 9)	.83* (N = 12)	.78* (N = 15)
NFO Rankers (N = 5)		
"B"		
Pilot Rankers (N = 7)	.82* (N = 14)	.84* (N = 15)
NFO Rankers (N = 8)		

* = p .05

Due to the small numbers of raters, this study will require replication to validate the consistency with which pilots and NFOs rank order peers on their initial acquisition capability. Consistency is necessary but not a sufficient psychometric property for using the peer ranking technique as a criterion measure. Pilots/NFOs may be ranking peers on the basis of their overall flying ability and reputation rather than initial target acquisition capability. To eliminate this alternative explanation for the data presented in this study, empirical validation of the data with reliable objective measures of in-air initial acquisition performance is desirable.

Appendix A

AIR-TO-AIR VISUAL TARGET ACQUISITION

All information will be used exclusively for research purposes

INSTRUCTIONS

Order the "top" five pilots with respect to performance in Air-to-Air Visual Target Acquisition. Air-to-Air Visual Target Acquisition refers to how well pilots establish initial visual contact with target aircraft.

Make your judgements as accurately as possible.

NAMES	NFOs record approximate number of flights with each pilot ranked.
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____

PILOTS: Out of a total number of _____ pilots, I rank number _____ in initial Air-to-Air Acquisition performance.

I have (circle one) High / Med / Low confidence in the above rankings.

If low, why? _____

Personal Information is CONFIDENTIAL and will only be used to assess ranking data.

Name: _____ Soc.Sec.No.: _____ Officer Rank: _____

(LAST) (First) (Mid.Init.)

No. of Months in Squadron: ☐☐ No. of Fleet Tours: ☐☐ PILOT? ☐ NFO? ☐

AIR-TO-AIR VISUAL TARGET ACQUISITION

All Information Will Be Used Exclusively for Research Purposes

INSTRUCTIONS

Order the "top" five NFOs with respect to performance in Air-to-Air Visual Target Acquisition. Air-to-Air Visual Target Acquisition refers to how well pilots establish initial visual contact with target aircraft.

Make your judgements as accurately as possible.

NAMES	PILOTS record approximate number of flights with each NFO ranked.
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____

NFOs: Out of a total number of _____ NFOs, I rank number _____ in initial Air-to-Air Acquisition performance.

I have (circle one) High / Med / Low confidence in the above rankings.

If low, why? _____

Personal Information is CONFIDENTIAL and will only be used to assess ranking data.

Name: _____ Soc.Sec.No.: _____ Officer Rank: _____
(LAST) (First) (Mid.Init.)

No. of Months in Squadron: ☐☐ No. of Fleet Tours: ☐☐ PILOT? ☐ NFO? ☐
