

Kenneth Hill

The Elderly Hunter

Abstract: *An investigation of 338 reports of lost deer hunters revealed that the incidence of lost hunters over age 65 was significantly lower, compared to younger hunters, than would be predicted by their numbers. Those elderly hunters who did become lost traveled as far and were just as likely to reorient themselves without assistance as were younger hunters. Moreover, lost elderly hunters, as well as other outdoor enthusiasts of advanced age, traveled much farther than the distance covered by cognitively-impaired wanderers from supervised care. The latter findings were discussed as having practical significance for the safety of the elderly person who becomes the subject of a land search. Generally, the results were interpreted as encouraging for elderly individuals wishing to continue participation in outdoor recreational activities in forested areas. That is, despite apparent decrements in spatial perception and memory, the older outdoor enthusiast may develop compensatory skills useful for wayfinding under difficult conditions.*

Research on leisure activities of older persons suggests that participation in outdoor recreation, such as hiking, fishing, nature photography, and bird watching, may be instrumental to their life satisfaction (Ragheb & Griffith, 1982). Unfortunately, a simple prescription that older people “should get out more” may not be appropriate. That is, many outdoor recreational activities may place the older person in an environment where he or she may be at risk for becoming spatially disoriented or lost, particularly in wooded or forested regions where wayfinding cues are scarce. Indeed, numerous laboratory studies suggest that the elderly may experience cognitive decrements in spatial memory (Ohta, 1981; Light & Zelinski, 1983; Perlmutter, Metzger, Nezworski, & Miller, 1981), the ability to orient oneself with respect to a map (Aubrey & Dobbs, 1989, 1990), the ability to acquire information that is critical for route learning (Evans, Brennan, Skorpanich, & Held, 1984; Lipman, 1991), and the ability to construct an adequate cognitive representation of one's surroundings (Walsh, Krauss, & Regnier, 1981). These studies would seem to indicate that older persons may lack the spatial skills necessary to safely negotiate the wooded, rural environments where many outdoor recreational activities take place.

However, in contrast to these studies suggesting widespread decrements in spatial abilities, other researchers have reported a somewhat different picture of the older person's spatial competence. For example, Ohta (1981) found that, although older subjects ($M = 71.6$ years) scored

more poorly than did undergraduates on paper-and-pencil measures of spatial ability, they performed equivalently to the younger subjects on a realistic wayfinding task that required them to find a short cut in a hospital setting. A study by Kirasic (1980; described by Ohta & Kirasic, 1983) demonstrated that the perspective-taking abilities of older subjects, as well as their abilities to accurately estimate the direction and distance of target sites in their environments, were inferior to that of younger and middle-aged subjects in a novel stimulus array, but were equivalent when the tests were conducted with array stimuli resembling the subjects' home towns. These and other studies reviewed by Ohta and Kirasic (1983) support their conclusion that research on the spatial abilities of older persons should include studies in which the elderly encounter environments having high ecological validity to them. Indeed, these authors suggest that most older persons may "know" their environments as well and negotiate them as successfully as do younger individuals.

The present study sought to examine this possibility by investigating the behavior of persons who engage in recreational deer hunting. Specifically, an attempt was made to assess the risk encountered by elderly hunters with respect to becoming disoriented in the forested environments where their sport normally occurs. Assumptions were made concerning the navigational difficulties involved in the pursuit of game, based partly on the work of Syrotuck (1977) as well as the author's interviews of experienced hunters. Briefly, these assumptions include the suggestion that hunting can involve highly challenging and easily underestimated wayfinding demands. It is proposed that hunting, particularly within densely forested areas, requires the hunter to engage in two effortful cognitive processes simultaneously, that is, keeping a constant "fix" on his location as he moves around in the woods searching for subtle signs of game. While many deer hunters work from stationary "stands", they are often required to leave such positions to pursue wounded game some distance through the forest. As Syrotuck (1977) has noted, the fact that most hunting occurs away from main paths and trails may be an important contributor to hunters' becoming disoriented. Moreover, the "excitement of pursuing wounded game", according to Syrotuck, may distract the hunter from keeping track of his location, putting him at greater risk for becoming lost.

To date, Syrotuck's monograph represents the only published research on the behavior of lost persons. He analyzed 229 lost person reports filed by park rangers and search units, most of which were located in the states of Washington and New York. He divided his sample into eight lost person categories, pertaining to the age or activity of the subject, and provided extensive statistical and descriptive information on each category. Although the largest single category was "Hunters" ($n = 100$), Syrotuck arbitrarily assigned all persons age 65 or older (regardless of their outdoor activity, including hunting) to a separate category labeled "Elderly" ($n = 24$). The major variable of interest to Syrotuck was the straight-line distance lost persons traveled from their last known locations, as such distances are routinely considered by search and rescue coordinators in locating lost subjects (National Association for Search and Rescue, 1987). Syrotuck found that lost hunters traveled somewhat farther than did elderly subjects, with a median distance of 1.6 miles from their last known locations compared to a median of 1 mile for persons of the elderly category (tests of statistical significance were not reported). Moreover, he also suggested that elderly persons are

more vulnerable to becoming disoriented than are younger individuals, suggesting that senility is frequently a factor when an older person become the subject of a land search (p. 22). However, he did not report data supporting this suggestion, nor did he specify what proportion of his sample of elderly lost subjects suffered from cognitive deficits associated with senile dementia or related disorders, such as Alzheimer's disease.

In describing the behavior of lost persons, Syrotuck (1977) maintained that most lost persons appear to spend the first 24 hours trying to regain their orientation and walk out of the woods on their own.¹ However, he did not report data on the numbers of lost persons who were able to reorient themselves, so it is not possible to determine whether such people behaved differently than did those who either had to be located by search teams or failed to survive. Although various factors may contribute to the ability of a lost person to find his or her own way out of the woods, particularly motivational and emotional states, recovering one's orientation after becoming lost might be regarded as an indicator of spatial competence in real world environments.

In the densely wooded Canadian province of Nova Scotia, hunting is an extremely popular recreational activity, as approximately one in every three males age 16 and over participates in some form of hunting with a firearm.² With respect to the older hunter, it is interesting to note that males age 65 or older constitute about 13% of the population and possess about 12% of hunting licenses. Although owning a license cannot be considered a direct measure of actual participation in the activity of hunting, this figure does suggest that hunting appears to be a popular activity among the elderly. The present study addresses the issue as to whether such individuals are at a higher risk than younger hunters for becoming severely disoriented, as evidenced by their becoming the subjects of an organized land search. An additional aim was to describe the behavior of the elderly lost hunter in comparison to younger hunters, to elderly lost persons engaged in other outdoor recreational activities besides hunting, and to cognitively impaired elderly individuals who had not been involved in some outdoor activity at the time of becoming disoriented.

¹ Interviews with hunters reveals that they frequently make an important distinction between being lost or merely "turned around". The latter, face-saving term is applied to the person who is able to walk out of the woods without being rescued by searchers (Hill, 1991).

² This estimate is based on a comparison of the 1986 census report with hunting licenses issued by the provincial Department of Natural Resources, most of which are for deer, plus an estimate of those additional non-licensed hunters who pursue rabbits and non-protected wildlife, such as doves, coyotes, porcupines, and woodchucks.

METHOD

Archival Data Collection

As part of an ongoing study of lost person behavior (Hill, 1991), data were collected from records of land searches for lost persons, maintained by Nova Scotia's Emergency Measures Organization (EMO). These records are filed by the 24 volunteer ground search teams covering different jurisdictions of the province. The reports consist of a form containing entries for the lost subject's name, age, sex, medical history, and other particulars. There is also a space for "notes" on which the responder can add additional details, if desired. There are over 800 such records dating back to 1976.

Limitations of these reports for research purposes. The lost person reports are collected primarily for informational and fiscal purposes rather than for research. Apart from being provided with the forms, search coordinators are not normally induced to fill them out accurately or completely. Indeed, it was estimated by EMO staff that reports are filed for only about half of the lost person incidents that occur. Although some reports are received from all search teams, it is possible that a selective bias may affect which reports are filed or which items on the form are left blank.

A more general consideration is the manner in which the subjects of these reports come to be labeled as "lost". In Nova Scotia, a lost person incident is normally initiated by a complaint to the jurisdictional police authority (usually the Royal Canadian Mountain Police) that a family member (or someone receiving institutional supervision) is missing or overdue. Often, as with a missing hunter, it is immediately apparent to the responding policeman that the subject of the complaint is "in the woods" and requires assistance by a search team, but sometimes such judgments are delayed until considerable investigation is conducted. Consequently, it may be possible that police officers respond differently to missing person reports depending on the perceived category of the subject, and that such differences may be reflected in the number of reports filed for each category of subject. Moreover, a delayed response could conceivably be reflected in longer distances traveled by the lost subject, higher possibilities of walking out unassisted by search teams, as well as lowered chances of survival. Unfortunately, there is no means of determining such possible systematic biases from examination of the lost person files reviewed.

Procedure

Data were collected from each report regarding the subject's age, sex, and type of recreational activity (if any). Also coded was the straight-line distance the lost person had traveled from his or her last known location before being found, whether the subject was accompanied by one or more persons during their ordeal (see below), whether the lost subject walked out of the woods before being located by searchers, and whether the incident had resulted in the subject's death.

Multiple-subject searches. A problem was anticipated with respect to categorizing mixed-age groups of lost persons, in which an elderly subject was accompanied by someone under 65. In order to include such possible cases in the analysis, it was decided prior to data collection that they would be categorized as “Elderly” if the oldest subject in the group was age 65 or over. It was proposed that an elderly person in a mixed-age group would likely be functioning in the role of leader, and would be largely responsible for the navigational decisions made during the group’s ordeal. It was recognized that this is not necessarily a sound assumption, particularly when the elderly subject’s companions are adults rather than children. Consequently, the possible effects this assumption may have had on data analysis were monitored.³

Hunting licenses. The question regarding the relative incidence of elderly lost hunters, compared to younger hunters, was addressed by obtaining figures on the sales of deer hunting licenses in the province of Nova Scotia. Such licenses are administered by the province’s Department of Natural Resources, which provides annual figures on the total number of licenses administered. Although summary figures are not tabulated regarding the specific age of applicants, the Department does keep track of those licenses administered to “seniors” age 65 and older. Such figures were acquired for the 1990 season.

RESULTS

Incidence of Lost Hunters

There were 338 reports of lost hunters, involving a total of 415 subjects (61 of the incidents involved two or more individuals). This represents approximately 40% of the 840 search reports examined, which is comparable to Syrotuck’s (1977) finding that hunters constituted 44% of the lost person incidents in his sample of 229 cases. All of the subjects of these incidents were male. The ages of the hunters ranged from 16 to 83 years, with a mean age of 37 years. Deer hunters constituted 97% of the sample, with the remainder hunting rabbits and other, unspecified small game.

Most of these incidents ($n = 213$) ended with the lost subjects being rescued by searchers, with many subjects apparently having to be treated for hypothermia and minor injuries. A total of 116 incidents were resolved when the subjects walked out of the woods unassisted by search teams (although frequently requiring treatment for hypothermia), and nine incidents ended with the subject’s death. All deaths were attributed to hypothermia or “exposure”.

³ As it turned out, such mixed-age groups were rare, with only two of the 338 incidents of lost hunters examined involving an elderly subject and a younger companion. One incident involved a 69-year-old man and his 16-year-old grandson who were safely rescued by a search team, while the other involved an 81-year-old man and his 28-year-old neighbor, who walked out of the woods before being found by searchers. Inclusion of these two incidents as “elderly” cases had no effect on data analyses or any conclusions of this study.

As distance traveled was recorded in only 77 of the 338 reports of lost hunters, this variable was not included in the first phase of the investigation.

Age groups. Twenty-one of the 338 reports — or 6% — involved the search for an elderly hunter, all of whom had been hunting deer at the time of becoming disoriented. The mean age for this group was 71.3 years, with a range of 65 - 83. Only two (or about 10%) of these incidents involved multiple subjects (see footnote 2). Although this is a lower percentage than that of multiple-subject searches for younger hunters (19%), the difference between the age groups does not reach statistical significance, $\chi^2 (1) = 1.10$.

Relative incidence of elderly lost hunters. Statistics provided by the province indicated that there were 78,278 deer licenses issued in the season of 1990. Of these 9,595 - or 12.26% - were held by seniors. This percentage is nearly identical to the percentage of male adults of this age in the population of Nova Scotia (13%), suggesting that deer hunting is indeed a popular recreational activity among the elderly, with approximately one in four men of this age group owning a license. With respect to their becoming disoriented while hunting, a statistical test of proportions revealed that the actual number of elderly hunters reported lost was significantly lower than would be expected, if merely owning a license is a valid indicator of risk, $\chi^2 (1) = 7.95$, $p < .01$. However, there are a number of caveats to this interpretation, as discussed below.

Reorientation. Six of the 21 elderly lost hunters (29%) walked out of the woods without having to be rescued by searchers, whereas 100 of the 317 non-elderly hunters (35%) were similarly able to reorient themselves. The difference in proportions does not approach statistical reliability, $\chi^2 (1) = .33$.

Survival rates. Three of the 21 incidents involving lost elderly hunters - or 14% - ended with the death of the subject. It is noteworthy that these incidents involved hunters on the lower end of the age range represented, from 65 to 67 years. All of these men were described as having died from heart failure due to hypothermia, although autopsies were apparently not conducted. In the group of 317 hunters under 65 there were only 6 deaths (2%), a proportion that is significantly lower than the rate for elderly hunters, $\chi^2 (1) = 11.67$, $p < .001$. The mean age of deceased hunters in the younger group was 44 years, with three of these men in their 50s. Thus, while the incidence of death was generally quite low, there appeared to be a nonlinear relationship between age and survivability, with most deaths occurring between the ages of 51 and 67 years.

Distance Traveled by Elderly Hunters

Only those reports indicating the straight-line distance the subject had traveled from his or her last known location were included in this phase of the analysis. This resulted in a sample of 11 elderly and 66 non-elderly hunters. As the distribution of distances traveled had a very high positive skew, medians rather than means were used as a measure of central tendency. Overall, the distances

ranged from 400 meters to over 19 kilometers, with a median of 2.75 km. A comparison between younger and older hunters revealed that persons in the elderly group traveled a median distance of 3.2 km. Although this is a half kilometer *farther* than the median distance of 2.7 km for the non-elderly group, results of a non-parametric, Mann-Whitney U test of the difference between groups does not approach statistical significance, $z = .4$.⁴

Reorientation and distance traveled. Among the sample of 77 hunters were 19 who had regained their orientation before being found by searchers, representing about 25% of the sample. Further analysis revealed that hunters (all ages) who had walked out of the woods on their own had traveled much farther (median = 6.5 km) than did hunters who did not (median = 2.06 km), a difference which is statistically significant according to the Mann-Whitney U test, $z = 4.29$, $p < .001$. This finding was not qualified by the age of the lost hunter.

Elderly hunters vs. other elderly lost persons. Among the search reports in which distance traveled was recorded were those for 13 elderly persons who had been engaged in other outdoor recreational activities besides hunting, including hiking, fishing, and gathering, as well as 11 elderly cognitively impaired elderly who had “wandered” from rural nursing homes and other forms of supervised care near wooded areas. There were seven cases of female subjects in these new groups, with five females in the “recreational” category and two in the “wanderer” group. A preliminary comparison of distance traveled between males and females resulted in the finding that, overall, elderly males had traveled farther (median = 2.1 km) than females (median = .8 km), $z = 1.71$, $p < .09$. In an effort to keep the groups as homogeneous as possible (there were no females in the hunter group), the seven reports involving females were deleted from the analysis, with only males considered. Table 1 presents summary data for the three groups of elderly male subjects.

As Table 1 indicates, hunters were the youngest of the three groups and had traveled the farthest distance. Although age had been unrelated to distance traveled in the previous analysis of hunters in general, the possibility remained that among this elderly sample, the relative youth of the hunters — rather than some factor related to hunting per se — had determined the distance they were found from their respective last known locations. However, a nonsignificant correlation coefficient suggested that there was no relationship between age and how far subjects had traveled, $r = -.11$, providing further support for the conclusion that, contrary to Syrotuck’s (1977) claim, advanced age is not necessarily a factor in predicting how far a lost person will move from their last known location.

A Kruskal-Wallis one-way analysis of variance by ranks revealed that the differences among groups in median distance traveled was statistically reliable, $H = 6.17$, $p < .05$. Non-parametric post-hoc comparisons between groups (Dunn, 1964) indicated that hunters had traveled significantly farther than did wanderers, $p < .05$, and that the difference between the recreational elderly and the wanderers was of a marginal statistical significance, $p < .10$.

⁴ Parametric analyses of variance of logarithmic transformations of distances traveled were conducted simultaneously with all non-parametric tests performed in the study. In all cases such tests led to the same approximate levels of significance as did the non-parametric equivalent, consequently leading to the same conclusions.

Table 1. Summary table for three categories of elderly lost persons (males).

<i>Category</i>	<i>n</i>	<i>M Age</i>	<i>Md Distance*</i>	<i>Survived</i>	<i>Walked Out[†]</i>
Hunter	11	68.5	3.20	8	3
Recreational	8	80	2.71	5	3
Wanderer	9	74	1.00	5	0

* *Straight-line distance in kilometers between last known location and position where subject was found.*

[†] *Number of subjects in each sample who walked out of the woods before being found by searchers.*

Reorientation by elderly lost persons. Six of the sample of 35 elderly subjects (17%) had been able to exit the woods unassisted by searchers. Consistent with the previous analysis of hunters in general (all ages), elderly persons who were able to reorient themselves traveled much farther (median = 4.41 km) than did those elderly subjects who were found by searchers (median = 1.2 km), a difference which is statistically significant by the Mann-Whitney U test, $z = 2.3$, $p < .05$. The six cases of self-reorientation were evenly distributed between the hunter and recreational groups, with none of the wanderers walking out of the woods without assistance.

Chi-square analyses on survival rates revealed no statistically significant differences among groups.

DISCUSSION

Generally, the results would appear to be encouraging for the fit elderly individual wishing to continue his participation in recreational deer hunting. While elderly men constitute over 12% of people licensed to hunt deer in the province of Nova Scotia, they become the subjects of only 6% of land searches for lost hunters. Moreover, lost elderly hunters were no less able than younger hunters to re-establish their orientation and walk out of the woods unassisted by searchers. Finally, survival rates for all ages of lost hunters were extremely high, despite the wet and sub-zero conditions under which most searches occurred. Although the incidence of death was higher in the elderly group, further analysis revealed that most deaths occurred between ages 51 and 67. Indeed, there were no deaths among the 15 lost hunters above this age range.

An analysis of distance traveled revealed that lost elderly hunters walked as far from their respective last known locations as did younger lost hunters. An important determinant of the distance a lost person will travel is assumed to be walking speed (Cornell & Heth, 1984; National Association for Search and Rescue, 1987). Consequently, the findings on distance traveled by older hunters are surprising in light of research indicating significantly declining walking speed in the

elderly (Imms & Edholm, 1981; Murray, Kory, & Clarkson, 1969). However, a recent study by Bendall, Bassey, & Pearson (1989) reported that declining walking speed in the elderly was associated with leg strength, health, and time spent in active leisure, and *not* with advanced age *per se*. These authors attributed earlier findings of marked decreases in walking speed by the elderly to methodological artifacts and sampling error; for example, the elderly subjects studied by Imms and Edholm (1981) had various physical disabilities. The sample of elderly lost hunters examined in the present study may well have consisted of relatively healthy individuals who engaged in outdoor activities on a regular basis, consequently not showing marked decrements in speed of walking. As well, other possible factors affecting distance traveled by lost persons, such as emotional and motivational states, may have contributed to the relatively long distances that elderly hunters walked. The identification of such factors awaits future research.

There is little support in these results for the claims by Syrotuck (1977) that the elderly lost person should be regarded differently than other lost person types, specifically hunters and persons engaging in other outdoor recreational activities. On average, elderly lost hunters traveled fully twice the distance of the one mile median found by Syrotuck for elderly persons in his study, while the older (non-hunting) outdoor enthusiasts, with a mean age of 80 yrs, traveled nearly as far as the hunters. As accurate predictions of the distance a lost person will travel are considered to be critical to land search planning (National Association for Search and Rescue, 1987), these findings would appear to have some practical significance for the safety of elderly persons entering the woods. That is, search organizers using Syrotuck's data, when searching for an elderly person not cognitively impaired due to Alzheimer's disease or similar form of dementia, could easily underestimate the size of the area that had to be searched in order to locate the subject.

On the other hand, results for the cognitively impaired wanderers in the present study more closely resembled Syrotuck's (1977) descriptions of the "elderly lost person" as frail and easily confused. It is possible, therefore, that his sample of older subjects contained a number of such impaired elderly, thus decreasing the median distance traveled by older subjects as well as biasing Syrotuck's impressions of the abilities and characteristics of elderly persons in general. Such "ageism" was perhaps excusable in 1977, before old age and senile dementia were widely revealed not to be synonymous, as research indicates that only a fraction of non-institutionalized elderly appear to have a dementia-related cognitive impairment (Kay & Bergmann, 1980).

To the extent that the results for elderly hunters can be interpreted as indicating spatial competence under challenging wayfinding conditions, despite declining spatial memory and other relevant cognitive skills, the study confirms Ohta and Kirasic's (1983) suggestion that older people may be able to negotiate their environments as well as do younger persons. If this is the case, then an appropriate target of future research would be the specific skills applied by older outdoor enthusiasts in compensating for such decreasing cognitive abilities. Studies by Charness (1981) and Salthouse (1984) are instructive in this regard. Charness (1981) compared older and younger skilled chess players and discovered that, although the two age groups played with equal skill, the older players had poorer memories for previous chess positions than did younger players.

Charness discovered that the older players apparently compensated for their deficient memory by using their comparatively limited cognitive abilities more efficiently. That is, they considered fewer alternative moves and made their decisions in less time than did younger players. In Salthouse's (1984) study of typists, it was found that typing speed was uncorrelated with age, despite declining reaction times in the older typists. It was found that the older typists more efficiently planned ahead by scanning more of the to-be-typed text as they worked, thus allowing themselves more time for typing each character. Such experiments confirm Welford's (1958) observation that "older people have a remarkable ability to compensate for any changes which may tend to impair their performance and show an automatic and unconscious reordering of their activity to make the best use of what capacities they have" (p. 286).

On the other hand, methodological shortcomings of the present study should be addressed before elderly outdoor enthusiasts can be confidently encouraged to continue their participation, however sound in mind and body they may be. Firstly, it must be pointed out that the ownership of a hunting license is, at best, an indication of an *intention* to hunt, rather than a direct measure of actual hunting frequency. There may be differences between younger and older hunters with respect to how often they hunt and therefore put themselves at risk for becoming lost. While differences in frequency of hunting can only be addressed through more direct methods than the archival data analyzed in this study, it should be recalled that the incidence of lost elderly hunters was *half* that which would be predicted by the sale of hunting licenses. Therefore, the actual participation of elderly deer hunters, despite their ownership of licenses, could be as little as half the participation by younger hunters without affecting the conclusion that older hunters are no more at risk for becoming lost than are their younger peers.

Similarly, apart from frequency of hunting, there may be age differences in the respective *styles* of hunting between young and older hunters. For example, it may be that elderly hunters penetrate the woods less deeply, possibly maintaining constant eye contact with salient landmarks and thereby placing less reliance on declining spatial skills. Although the equivalent distance traveled by younger and elderly lost hunters would seem to suggest equal penetration of the forest, with comparable abilities to find their own way out of the woods, it is not clear what generalizations can be made about the hunting style of the "typical" elderly hunter based on an examination of the few who become lost. Indeed, a cautious interpretation of these results would be that it is the elderly hunter who strays far from known locations who becomes a lost person statistic, while the older hunter who stays closer to his car, for example, puts himself at much less risk. In addition to examining possible compensatory skills employed by elderly hunters, future research should compare the behavior of those elderly hunters who become lost with those who manage to maintain their orientation.

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