

Demographic transition among hunters: a temporal analysis of hunter recruitment dedication and motives in Denmark

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Abstract

Context. In many countries, hunting has emerged as a major source of funding for wildlife conservation and research or habitat acquisition. In some countries, recent declines in recruitment of hunters have generated concerns about the consequences of the rapid demographic change within society in general, and among hunters in particular. Gaining a better understanding of how these demographic changes influence dedication to and motivation for hunting has therefore become an important task.

Aims. Our aims included documenting the demographic transition among Danish hunters, and identifying correlates of hunter recruitment age, motivations and dedication.

Methods. We addressed these aims using a national survey of Danish hunters in 2000 ($n = 1186$) and 2006 ($n = 701$). Survey data were analysed using multiple regression models.

Key results. Whereas recruitment numbers remained stable, the average age of recruitment for hunters increased from 21 to 34 between 1984 and 2006, and the percentage of new hunters younger than 20 declined from 63% to 19% during the same period. Respondents who hunted to experience nature were recruited at older ages than other hunters. Recruitment age was negatively related to number of days hunting per year and relative importance placed on hunting as a recreational activity, and positively related to being recruited by friends, female gender, being married, and having an urban childhood.

Conclusions. The global demographic transition towards an older and more urban populace may drive a change in hunter demographics rather than a decline of hunting.

Implications. The present study suggests that hunting can persist in the face of rapid demographic change. However, the study also indicates several important structural barriers for new hunters, favouring those hunters being economically most well off and leading to a decline in hunting dedication. To meet these challenges, the study suggests that modifications will be needed in hunter education programs and hunter recruitment campaigns, so as to maintain hunting as a significant positive factor within wildlife conservation.

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Introduction

Hunting has played a major role in wildlife conservation for millennia. Egyptian hunting records from 2500 BC (Leopold 1933) and Genghis Khan's 13th century hunting preserves (Caughley 1985) demonstrate the history of hunting in wildlife management. In North-America as well as in many countries in Europe, hunting has emerged as a major source of funding for wildlife conservation and research or habitat acquisition (Dalrymple *et al.* 2010). The critical role of hunting in wildlife conservation, as well as recent declines in recruitment of hunters (Leonard 2007) and popularity of hunting, has motivated numerous studies examining perceptions of and participation in hunting (Stedman and Decker 1993; Heberlein and Willebrand 1998; Miller and Graefe 2001; Zinn *et al.* 2002; Li

et al. 2003; Campbell and Mackay 2003; Clendenning *et al.* 2005; Heberlein and Ericsson 2005; Peterson *et al.* 2006). The above research has justifiably focussed primarily on the United States where the percentage of hunters fell in half, from 8% to 4% of the population, between 1975 and 2006 (US Department of the Interior and US Department of Commerce 2002, 2007).

Simultaneously, urbanisation has altered the social and spatial context of hunting in Western European and North American countries by influencing educational levels, occupational patterns, and the values society attaches to nature. Persson (1979, 1984) initiated research on the impacts of urbanisation on hunting in Sweden in the 1970s. He found that as Swedish hunters become more urban, they were more likely to lack childhood experiences with hunting, causing radical changes

in hunting culture. Persson (1984) found that hunters initiated to hunting later in life were not as dedicated to hunting as hunters introduced to hunting early in life. Decker *et al.* (1984) found similar patterns in a study of United States hunters. Namely, hunters not raised in a hunting cultural environment – labelled family non-supported – are divided from hunters exposed to some kind of hunting culture during childhood – labelled family supported – in their motives for hunting and their hunting preferences. Hunters introduced to hunting early in life were often more dedicated to hunting, particularly to small-game hunting. Conversely, those hunters who started hunting later in life were often introduced to hunting by friends or work colleagues; they often had a greater interest in big-game hunting and were less dedicated. Although North American research suggests that urbanisation was associated with declines in hunting participation, such trends seem less obvious in Scandinavian contexts (Hansen 2001a, 2001b). Further, in North America, aging of the hunting population was attributed to a lack of recruitment, combined with aging of hunters, whereas the relationship has not been explored in other nations.

Little research has explored the relationships between social demographic transition (aging and urbanisation) and the concomitant transformations among hunters (e.g. demographics, motivations, dedication). These phenomena have serious implications for how attitudes and values among hunters will change, how effective hunting may be as a tool for managing wildlife populations, and how wildlife managers may need to accommodate hunters. Rapid aging among hunters, associated with recruitment of older hunters or lack of recruitment among young hunters, may require wildlife managers to provide new forms of access for elderly hunters or training for hunters not exposed to processing game through familial social networks.

Scandinavian countries provide a good opportunity for evaluating the impacts of demographic transition on hunter aging and dedication because of the long-existing tradition of hunting game for consumption among the general populace (The Nordic Hunters' Cooperation 2008), and because these countries have already undergone demographic transitions towards more urban and older populaces. Hunting in Scandinavia is still a widespread activity and the Scandinavian countries share, to a large extent, the same political, social and cultural history. In addition, three of the countries – Denmark, Norway and Sweden – have closely related languages and the hunting organisations of Denmark, Sweden Norway and Finland have a well organised and systematised political collaboration. Overall, one can say that the hunting culture as well as the socio-demographic premises for hunting in Scandinavian countries are quite similar, and distinguish themselves from the rest of Europe, being, in many ways, more comparable with the hunting culture in North-America (Hansen *et al.* 2010).

Using Denmark as a case study, we conducted a survey on demographic transition on hunter aging and hunting dedication (Hansen 2001a, 2001b; Jensen 2007a, 2007b). Denmark has a long history of hunting, with a hunting culture strongly influenced both by the hunting traditions of the French, German and English aristocracy and by the Scandinavian traditions of hunting as a supplement to the household economy. With the exception of hunting in wetlands and on the oceans, which was available to all citizens, hunting was largely reserved for the royal court and the

aristocracy until 1850 (Weissman 1931). Between 1851 and 1931, hunting was gradually democratised by linking the right to hunt with land ownership. In 1922, 64 420 persons of ~3.3 million Danish residents bought an annual game licence (Strandgaard 1962; Statistics Denmark, Population and elections, <http://www.dst.dk/en>, verified 26 May 2012). Although Denmark was highly urbanised by the late 1900s, ~230 000 of the 5 million residents were registered hunters, having completed the educational program required for hunting in Denmark in 2009. Of those, ~166 000 persons paid the annual hunting fee for 2008/09 (Miljøministeriet, Skov og Naturstyrelsen 2010). The number of hunters annually paying the hunting fee has been stable since 1990. This stability is remarkable, because Denmark is an urbanised society with a relative high population density (126.1 km²), and because very little hunter recruitment has been done. The relative stability in the total number of hunters in Denmark, however, does not reflect stability in hunting itself. Since the 1950s, hunting in Denmark has undergone a gradual transition from a use-based activity to a recreational pursuit.

We provide the first account of how age at which new hunters are recruited has changed over the past six decades, we document the demographic transition among Danish hunters and identify correlates of hunter recruitment age, motivations and dedication.

Methods

We conducted a nationwide mail survey of the members of Danish Hunters' Association (DHA) in 2000 (January–March) and 2006 (August–October). In 2000, the official number of registered members of DHA was 83 641, and in 2006, the official number of members was 81 504. We used the smaller survey in 2006 to extend and validate trends in the age of recruitment, whereas all other variables and analyses relied on data from the 2000 survey. We mailed the 2000 questionnaire to 1507 randomly selected DHA members, and the 2006 questionnaire to 1000 randomly selected DHA members.

We accessed how the average age of new hunters changed over time, by asking hunters when they started hunting (combined with their current age, this provided an estimate of age when the respondent started hunting). Although recall bias may exist with this approach, extensive literature suggests that a person's first hunt is a profound and life-changing event that is unlikely to be forgotten (Gasset 1972; Shepard 1973; Dizard 2003). We used standard metrics, used by Statistics Denmark (<http://www.dst.dk/en>, verified 26 May 2012), to measure all other demographic variables (e.g. education, income, marital status, urbanisation level of the home city). We created dummy variables for gender, whether the respondent's spouse hunted, and marital status. We evaluated what type of hunting the respondents preferred by asking them what type of hunting they would choose if they had only one option (with big-game and small-game hunting as options). We measured dedication to hunting by asking respondents whether hunting was more important to them than were their other recreational activities, how many days per year they hunted, and how much money they spent annually on hunting. We measured motivations for hunting by asking the respondents to check items from a list of reasons why they hunted. The list included the following: to be with friends, to kill game, to

face a challenge, to relieve stress, to kill a trophy, to get meat, to experience nature, and to work with hounds. Finally, we asked the respondents to indicate whether they participated in big-game or small-game hunting.

All descriptive and inferential statistics were calculated using SPSS (Release 15.0.0, SPSS, Chicago, IL, USA). We used ordinary least-squares (OLS) regression to predict the age at which hunters were recruited, days spent hunting per year and annual expenditures (Hosmer and Lemeshow 2000). We used binary logistic regression to assess whether the age at which hunters were recruited predicted whether respondents believed hunting was more important than all other recreational activities, while accounting for multiple control variables simultaneously (Cohen and Cohen 1983).

Results

We achieved a 79.4% response rate for the 2000 survey ($n = 1197$, 2.81% margin of error), and a 70.1% response rate for the 2006 survey ($n = 701$, 3.69% margin of error). The average age of recruitment for hunters increased from 21 to 34 years between 1984 and 2006 (Fig. 1). The percentage of new hunters between 15 and 19 years old declined from 94% to 19% between 1940 and 2006, and it declined faster than the percentage of Danes of the same age during the same period (Fig. 2). Several factors predicted the age of recruitment (Table 1). Hunters recruited at an older age were more likely to have started hunting more recently, be introduced to hunting by a friend (*versus* a family member), hunt fewer days, place less importance on hunting, be married, be female, and be raised in more urban environments than were hunters recruited at a younger age. There was no detectable difference between the recruitment age of hunters who preferred big-game hunting (21.53 ± 0.44) and that of hunters who preferred small-game hunting (22.00 ± 0.36 ; $t = 0.83$, $P = 0.41$). Similarly, there was no detectable difference among the average recruitment age of hunters on the basis of any motivations except hunting to experience nature. Hunters who hunted to experience nature were older than those who did not (Table 2).

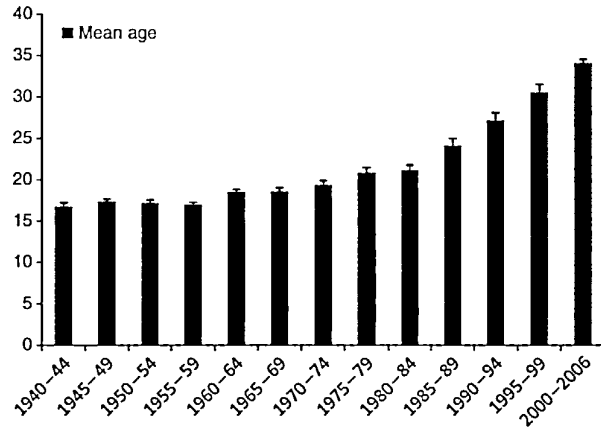


Fig. 1. The mean age, and standard errors, of new hunters during 5-year periods between 1940 and 2006.

After accounting for control variables, the recruitment age predicted two measures of dedication to hunting (number of days hunting per year and whether hunting was considered more important than were other recreation activities, Table 1). Hunters recruited at an older age spent fewer days hunting per year and placed less importance on hunting relative to other recreational activities than did hunters recruited at a younger age. Interestingly, income and education were positively related with annual expenditures, and negatively related with the number of days spent hunting. The degree to which hunters had an urban childhood was positively related to annual hunting expenditures, whereas we detected no relationship with the number of days spent hunting or the importance placed on hunting relative to other recreational activities (Table 1).

Discussion

A demographic transition among Danish hunters that occurred between 1980 and 2006 has fundamentally altered the landscape for management of both hunting and wildlife in Denmark.

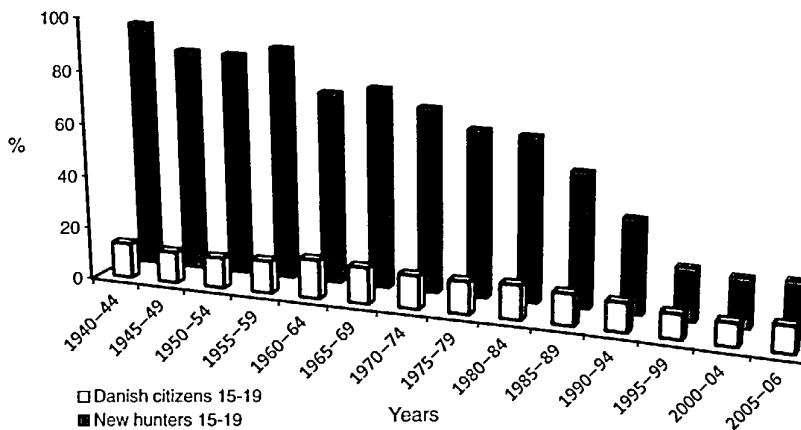


Fig. 2. Percentage of hunters between 15 and 19 years old who started hunting during the 5-year periods between 1940 and 2006, compared with the percentage of Danish population of the same age during the same period.

Table 1. Ordinary least-squares (OLS) and logit regression analyses of number of days hunting per year, annual hunting expenditures, willingness to pay for hunting annually and hunting importance

Hunting importance is coded as follows: 1, more important than other recreation; 0, less important than other recreation. Marital status is coded as follows: 0, single; 1, married. * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$; n.a., not available

Dependent variable	Independent variable (standardised coefficient)											R^2
	Recruitment age	Year start	Friend recruit	No. of days hunting	Annual expenditure	Hunting importance	Education	Income	Marital status	Gender	Urban childhood	
Recruitment age	n.a.	0.40***	0.27***	-0.11**	-0.01	-0.07*	-0.04	-0.01	0.14***	0.11***	0.11***	0.37
No. of days hunting	-0.11**	0.02	<0.001	n.a.	0.44***	0.28***	-0.06*	-0.06*	0.04	0.03	<0.001	0.38
Annual expenditure	-0.01	0.08*	0.02	0.47***	n.a.	0.15***	0.06*	0.09**	0.03	-0.03	0.06*	0.34
Hunting importance	-0.03***	-0.002	-0.232	0.15***	0.43***	n.a.	-0.04	0.19	-0.16	-0.02	0.04	0.33 ^C

^CNagelkerke R^2 .

Table 2. Comparison of mean age of first hunt by motivation for hunting
* $P < 0.05$

Motivation for hunting	<i>n</i>	Percentage	Mean age of first hunt (s.e.)	<i>t</i>
Hunt to experience nature				
Yes	980	83.33	21.87 (0.27)	-2.04*
No	196	16.66	20.51 (0.55)	
Hunt to be with friends				
Yes	761	64.77	21.59 (0.31)	0.336
No	414	35.23	21.76 (0.43)	
Hunt for meat				
Yes	110	9.36	22.38 (0.78)	-0.942
No	1065	90.64	21.57 (0.26)	
Hunt for trophy				
Yes	74	6.30	20.99 (0.85)	0.685
No	1101	93.70	21.69 (0.26)	

Although the number of new hunters has not declined, the new older recruits differ in several ways from new hunters before the 1980s. The >44% decline in the percentage of young (<20) hunters among new recruits was related to increasing percentage of females, people with urban childhoods and people introduced to hunting by friends. These changes suggest that hunter preferences and behaviours may progressively reflect more urban and female sentiments, such as concern for animal rights and endangered-species protection (Peck *et al.* 1996; Czech *et al.* 2001). Further, management of hunting activities will need to accommodate the elderly in ways similar to other recreational activities (Mital 1994). Future research should address the potential for progressively higher average recruitment ages to translate into higher turnover among active hunters.

The rapid demographic change among Danish hunters identified in the present study highlights the potential for hunting to persist as a relatively common activity in the face of rapid global urbanisation. This differs from North American contexts where a drop in the recruitment among young rural hunters has not been compensated for by increasing recruitment among older and more urban hunters (Leonard 2007). The demographic change, however, does suggest that modifications will be needed in hunter education programs and hunter recruitment campaigns. New hunters introduced by friends

instead of family are not exposed to procedures required for converting a carcass to packaged meat during the years of interactions with family before their first hunt. As a middle-aged person, the new Danish hunter will probably need more practical guidance such as how to process meat and less emphasis on issues such as not playing with guns than does a 16-year old. Our results suggest that campaigns to recruit new hunters may benefit by targeting females and older participants, and by utilising social networks used to connect friends (e.g. new media).

The demographic transition among hunter may present several important structural barriers for new hunters, including longer distances from residence to hunting grounds, and difficulty keeping the legally mandated hunting dogs in urban communities. These factors work to create barriers for new hunters and will probably, in the long run, favour those hunters that are economically most well off. This trend may reverse the recent shift towards democratisation of hunting in Denmark. Because of the widespread hunting tradition in many parts of the Danish society, hunting benefits by holding a relatively positive position in the society at large, although the changes towards greater social and economic exclusivity might change this. However, hunters in Denmark, to a growing extent, seem to reflect the rest of the population more and more when it comes to the place of settlement, education and occupation. Also, the fact that new hunters, to a larger extent than before, initiate their partners into hunting and thereby turn their practice of hunting into a common family activity, can work to the advantage of hunting – and might help securing this kind of recreational activity for the future.

Post-demographic-transition hunters in Denmark were motivated to hunt by the desire to experience nature. This finding reflects the fact that different motivations were found among hunters not raised in the environment of hunting culture and those exposed to some kind of hunting culture during childhood. The trends in hunting motivations reflect those in North America, with nature hunting being the most prevalent, followed by social hunting, meat hunting, and finally, trophy hunting (Eliason 2008). In Denmark, nature hunters constitute 83% of all hunters compared with 20–30% in North America (Gigliotti 2000; Boulanger *et al.* 2006). The increased value placed on experiencing nature among the newly recruited, and older, Danish hunters suggests growing common ground between hunters and other outdoor recreation groups, decreasing the gap

between their historically utilitarian and preservationist ideologies, respectively (Dunlap and Heffernan 1975; Tarrant and Green 1999; Peterson *et al.* 2008).

Although our results suggest the demographic transition will lead to lower levels of dedication to hunting among participants, this shift may not have detrimental impacts on the economics of hunting in Denmark. As in North America (Decker *et al.* 1984; Leonard 2007), the demographic shift predicts lower dedication levels among hunters in the future. In Denmark, however, the new, less dedicated hunters, as measured by days in the field, spent more money on average than did other hunters. This finding implies that the demographic transition among hunters in Denmark may actually help increase the positive impact of hunting-related spending on conservation and rural economics, through increased spending on hunting equipment and hunting-related travel or land leases (Dalrymple *et al.* 2010). Of course, lower number of days spent in the field among post-demographic-transition hunters may raise challenges for efforts to use hunting as a source of additive mortality to control wildlife populations (Gauthier *et al.* 2001). This challenge may be exacerbated by a trend towards shorter hunting seasons for some species (e.g. the common wood pigeon (*Columba palumbus*)) and declines in the number of huntable species (the number decreased from ~80 to 44, between 1967 and 2008) (Noer *et al.* 2009).

Declining relative importance of hunting as a recreation activity among hunters may be less problematic than one might expect. The late starters may view hunting on par with their other leisure activities, in contrast to the early starters, who started hunting before any other recreational activity. Because new Danish hunters start at a much older age, they probably entertained several recreational pursuits before hunting, and continue participating after they start hunting (Iso-Ahola *et al.* 1994). By fostering a hunting populace with social networks including other outdoor recreation pursuits, these changes may facilitate collaborative and cooperative multi-stakeholder conservation initiatives needed to address pressing wildlife conservation issues, including those associated with controlling invasive alien species and zoonotic disease.

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