



Università degli Studi di Milano

Department of Veterinary Medicine and Animal Sciences (DIVAS)

PhD Course in Veterinary and Animal Science
Main domain: Economics and Management (AGR/01)
Class XXXV

**An analysis of the (post)modern hunting:
exploring consumers' perception towards hunted wild game meat and insights
into the role of hunters in the contemporary era**

Author: Annafrancesca Corradini

Supervisor: Prof. Anna A. M. GAVIGLIO

Co-Supervisor: Prof. Michael GIBBERT

Academic Year 2022/2023

Table of Contents

Abstract.....	7
Sintesi	9
CHAPTER I	12
‘Run with the hare, hunt with the hounds’: the good and the bad of hunting in Western cultures	12
1.1 The good side of hunting.....	12
1.2 The bad side of hunting.	14
Ph.D project’s roadmap: three stages and achieved aims.....	15
CHAPTER II	21
Consumers' perceptions and attitudes toward hunted wild game meat in the modern world:	
A literature review	21
Abstract.....	21
1.Introduction	22
2. Methodology	24
3.Results	30
3.1 General overview of the included studies	30
3.2 Consumers’ perceptions and attitudes toward hunted wild game meat.....	33
4.Discussion.....	43
4.1. The roles of gender and residence in HWGM consumption	43
4.2. The positive drivers of HWGM consumption	45
4.3. The motives for HWGM rejection	47
4.4. The seasonality of HWGM and the provision issue	48
4.5. Policy and managerial implications for HWGM market development	49
4.6. Limitations.....	50
5.Conclusions	50
CHAPTER III	62
‘I’m better than you’: assessing the presence of Optimistic Bias among Italian wild ungulates hunters.	62
.....	62
Abstract.....	Errore. Il segnalibro non è definito.
1. Introduction	64
2. Method	67
3. Results and discussion	70
3.1. Sociodemographic characteristics of the sample.....	70
3.2 HWGM destination, self-reported practices, and hunters’ self-definition.....	72
3.3 Hunters’ risk perception of HWGM preparation related practices.....	74
3.4 Hunters’ training and knowledge of basic principles for HWGM safety.....	75
3.5 Italian hunters’ Optimistic Bias	76
5. Conclusion	81
CHAPTER IV	89
Rethinking the role of ‘the hunter’ in the postmodern era:	
a case study from the Grisons Canton, Swiss.....	89
Abstract.....	89
1. Introduction.....	90
1.1 Hunting as a tool to manage wildlife: the hunter as a ‘responsible citizen’.....	90
1.2 The hipster ideal of food self-sufficiency: the hunter as a ‘responsible consumer’....	91
1.3. An army of new Artemis:	
female hunters’ participation in a traditionally male dominated arena	92
1.4 Swiss hunting: the Grisons as case in point	93
2. Methodological approach	96
3. Preliminary findings	99
3.1 Becoming a hunter	100
3.2 On the killing of animals and death	102

3.3 Motivation	103
3.4 'Being a hunter': perspectives from in-and-out of the community	106
4. Preliminary discussion and conclusions	111
CHAPTER V	
Conclusion	119

There are these two young fish swimming along, and they happen to meet an older fish swimming the other way, who nods at them and says “Morning, boys. How’s the water?” And the two young fish swim on for a bit, and then eventually one of them looks over at the other and goes, “What the hell is water?”

(...)

It is about the real value of a real education, which has almost nothing to do with knowledge, and everything to do with simple awareness; awareness of what is so real and essential, so hidden in plain sight all around us, all the time, that we have to keep reminding ourselves over and over: “This is water”.

David Foster Wallace

Abstract

Although not practiced for subsistence, hunting is still popular in Western countries and hunted wild game meat (HWGM) is its product. Consumer science literature reports that HWGM is increasingly appreciated by consumers, who link to this product several positive attributes (i.e., HWGM is healthy, comes from a non-farmed animal, and its production is proved to be more environmentally sustainable than farmed meat). On the other hand, the debate around hunting legitimacy in the contemporary era is still heated. Hunters are often condemned, since hunting is considered by some parts of the public to be obsolete, cruel, and unacceptable, as long it is practiced for recreational purposes. Based on these premises, the objective of this thesis is to investigate and understand, both from the perspective of the consumer and the producer (the hunter), how hunting and HWGM are perceived by them. This thesis is based on three studies. The first study (Chapter II) seeks to identify which variables are connected to consumers' perceptions and attitudes towards HWGM by reviewing the existent body of literature on the topic. The second study presented (Chapter III) aims to assess the presence of Optimistic Bias in Italian hunters, since the presence of this cognitive bias may alter the hunter's perception of the risk connected to the implementation of improper behaviours during HWGM manipulation, threatening consumers' health. The third study (Chapter IV) aims to understand how hunting (and, thus, hunters) is reframing its role into society, by providing an in-depth analysis of (new) hunters identities.

The results of this thesis want to shed light on different features that characterize i) the HWGM consumers and ii) the hunter, analysing them as two key-actors involved in the contemporary re-negotiation of the image of contemporary hunting.

Sintesi

Sebbene non sia praticata per la sussistenza, la caccia è ancora popolare nei Paesi occidentali e la carne di selvaggina cacciata ne rappresenta il suo prodotto principale. La letteratura scientifica che studia le percezioni e gli atteggiamenti del consumatore verso i prodotti di origine animale riporta che la carne di selvaggina sembra essere sempre più apprezzata negli ultimi anni. I consumatori associano a questo prodotto diversi attributi positivi. Per esempio, ne vengono valutate positivamente le caratteristiche nutrizionali ed il suo metodo di produzione viene percepito come più sostenibile dal punto di vista ambientale a confronto del prodotto allevato.

D'altra parte, il dibattito sulla legittimità della caccia nell'era contemporanea è ancora acceso. I cacciatori sono spesso condannati, poiché la caccia è spesso considerata da parte dell'opinione pubblica obsoleta, crudele e inaccettabile, in quanto praticata prevalentemente a scopo ricreativo.

Sulla base di queste premesse, l'obiettivo di questa tesi è indagare e comprendere, sia dal punto di vista del consumatore che del produttore (il cacciatore), come la caccia e le carni di selvaggina siano percepite e quale sia il ruolo del cacciatore nell'era contemporanea. Questa tesi si basa su tre studi. Il primo studio (Capitolo II) cerca di identificare quali variabili siano collegate alle percezioni e agli atteggiamenti dei consumatori nei confronti delle carni di selvaggina, revisionando la letteratura esistente su questo argomento. Il secondo studio presentato (Capitolo III) mira a valutare la presenza di un *bias* cognitivo (*Optimistic bias*) nei cacciatori italiani, poiché quest'ultimo potrebbe alterare la percezione del rischio del cacciatore stesso rispetto alle proprie abilità nella messa in atto di comportamenti 'corretti' durante la manipolazione della selvaggina, con la conseguenza che ne risulti minacciata la salute del consumatore finale. Il terzo studio (Capitolo IV) mira a comprendere come la caccia (e quindi i cacciatori) stia ridisegnando il proprio ruolo nella società; si fornirà un'analisi approfondita delle (nuove) identità dei cacciatori. I risultati di questa tesi

vogliono far luce sui diversi tratti che caratterizzano i) i consumatori di selvaggina e ii) il cacciatore, analizzandoli come due attori chiave coinvolti nella ri-negoziazione dell'immagine della caccia nell'era contemporanea.

List of Papers

This thesis is based on the following three papers:

1. **Consumers' perceptions and attitudes toward hunted wild game meat in the modern world: A literature review**
Annafrancesca Corradini, Maria Elena Marescotti, Eugenio Demartini, Anna Gaviglio
Published in: *Meat Science*, Volume 194, 2022, 108955, ISSN 0309-1740,
<https://doi.org/10.1016/j.meatsci.2022.108955>.
2. Submitted to *Food Control*
'I'm better than you': assessing the presence of Optimistic Bias among Italian wild ungulates hunters.
Annafrancesca Corradini, Eugenio Demartini, Roberto Viganò, Maria Elena Marescotti, Anna Gaviglio
3. Working paper (further submission)
Rethinking 'the hunter' in the postmodern era: a case study from the Grisons Canton
Annafrancesca Corradini, Lisa März, Anna Gaviglio, Michael Gibbert

Introduction

‘Run with the hare, hunt with the hounds’: the good and the bad of hunting in Western cultures.

1.1 The good side of hunting. Hunted Wild Game Meat (HWGM)

Scientific evidence suggests rising public concerns about implications regarding meat consumption (Alonso et al., 2020; Sanchez-Sabate et al., 2019; Willett et al., 2019) and livestock production in high-income countries. Even if meat-based diets still prevail in Western societies, consumers are becoming more informed and aware of issues related to animal production methods (Segovia-Siapco & Sabaté, 2019). Due to this reason, in the last decade, several studies in consumer science have focused their attention on consumers’ perceptions and attitudes towards meat and meat consumption (Verbeke & Viaene, 2000). Evidence from this stream of literature indicates that contemporary consumers are increasingly oriented toward the choice of animal products whose production methods are sustainable and respectful towards both to the environment and animal welfare (Tomasevic et al., 2020) endowed with healthy nutritional characteristics (Hoffman & Wiklund, 2006). In response to that, hunted wild game meats (HWGM) are undergoing a slow-rising revival both from researchers and from a niche of consumers in countries with a high level of prosperity (Hoffman & Wiklund, 2006; Marescotti et al., 2019). This may be due to the fact that HWGMs possess peculiar features that, at least theoretically, make them interesting alternative animal proteins, especially when comparing them to conventional (farmed) meats (Marescotti et al., 2019). HWGM in fact might address the consumer's demand for

animal products from ethical, health, and environmental dimensions (Hoffman & Wiklund, 2006; Demartini et al., 2018; Tomasevic et al., 2018).

In the last decades, the public attitude towards animals shifted from a utilitarian perspective to a more compassionate and empathetic one (Buddle et al., 2018) this is also true considering consumer concern for animal welfare that appear increasingly affects consumers' behavior when looking for meat products (Alonso et al., 2020; Webster 2001) From an ethical perspective, HWGM derives from animals that are born and live free and that are harvested in their natural habitat (Marescotti et al., 2020) and thus, the level of animal welfare of hunted wild animals could be considered a priori higher than conventional livestock. Meat production processes continue to trigger ethical issues such as the heated public and scientific debate around the animal welfare of the most farmed species. HWGM harvesting practices allow the elimination of the transportation and slaughtering phases from the meat production supply chain, which are two of the most harmful and stressful practices for livestock in production (Carlsson et al., 2007; Viganò et al., 2019) Moreover, consumers recognize healthiness as an important attribute especially referring to meat products. The body of existing literature suggests that HWGMs are valuable resources to be included in human diets, due to their nutritional characteristic. Generally, such meats have high-quality protein and low-fat content, with an optimal fatty-acid composition, depending on the species considered (Rule et al., 2002; Bureš, 2014; Hoffman & Wiklund, 2006) Looking at the environmental dimension, considering ground consumption, waste production and GHG emission hunted wild game meat could be considered an environmentally sustainable product; even if little has been done in the literature about this topic, HWGM appears to be more environmentally sustainable when compared to conventional meat products (Fiala et al., 2020).

1.2 The bad side of hunting. Consumers' mistrust in hunters' abilities and public's perception of hunters

On the other hand, although HWGM possesses features that make it a possible interesting alternative meat for modern consumers (Hoffman & Wiklund, 2006) whatever the species, these meats represent the final product of a hunting action. Hunters are drawn mostly as enthusiastic hobbyists who practice this activity for recreational purposes (Marescotti et al., 2021) thus, they may hardly identify themselves as potential primary producers. Although in modern Western society the hunting activity is not practiced for food provision, hunters usually eat their preys, in many cases donate part of the meat to relative and friends, and in some cases sell the HWGM to local food business for human consumption (Gaviglio et al., 2018)

In this sense, hunters are contemporaneously food handlers and the first consumers of HWGM. Therefore, they are responsible for the safety of the HWGM they (and other people around them) eat. Some authors have reported that consumers may not trust HWGM food safety, due to the fact that it is connected to hunters' abilities to implement correct action during the 'production process' (Bekker et al., 2011).

Moreover, recreational hunting is one of the most controversial activities, able to divide public opinion since for many years has been labeled as a cruel practice, accused of violating the right to live of wild animals (Mehmood et al., 2003). Even if scholars recognize that hunting represents a tool to manage wildlife (Mahoney, 2009) recreational hunting's morality and legitimacy are issues that remain unsolved, even if largely debated in philosophical, anthropological, and sociological terms. Minnis (1997) underlined the theme's complexity, highlighting the impossibility of reducing the debate to mere contraposition between hunters and anti-hunting (Minnis, 1997).

When investigated empirically, hunting moral views by nonhunters and hunting critics groups have been discovered to be not so dissimilar among them and trace what is theorized by philosophers: hunting acceptance changes not only across hunting

practices (i.e., hunting techniques or hunted species) but is also related to moral imperatives (e.g., recreational hunting can be accepted *only if* the hunter eat the quarrel prey (Fischer et al., 2013). In this state of affairs, a future scenario for hunting has been proposed by Hampton & Teh-White (2019) recreational hunters may lose the ‘*social licence*’, a form of unwritten public consent, which can bring about more severe regulatory restriction. In this sense, recreational hunting seems to need to ‘adapt’ to the post-modern era, since its traditional role in Western societies is undertaking a crisis. Is there a future for hunting in Western countries? And what role does HWGM may play in shaping the future of this activity? Without necessarily having to choose between 'running with the hare' or 'hunting with the hounds' (and therefore without attempting to take a position on the theme), this work, representing a synthesis of my three years of PhD, aims to offer an analysis of the current role of a peculiar meat product (HWGM) and its producers (hunters). These two elements will be analyzed from different standpoints, in order to describe the role of hunting in the (post)modern era: thus, consumers' perception of HWGM and the role of the hunter, both in the HWGM production process and in society, will be investigated.

Ph.D project’s roadmap: three stages and achieved aims

The Ph.D. research project is focused on the two faces of HWGM as a meat product derived from hunting, explored through an investigation of HWGM from a consumer perspective and two insights into the HWGM producer (i.e., the hunter) perspective. The aim has been accomplished with a mixed approach that involved a combination of quantitative data collection methods (such as an online survey) and qualitative methods (a review of the literature and ethnographic interviews) according to the objectives, timing, case study, and resources/budget constraints. The roadmap of the project is composed of three fundamental stages.

Stage 1: Understanding consumers' perception and attitudes towards hunted wild game meat What do consumers think about HWGM? What are the variables related to consumer perceptions and attitudes toward HWGM?

The first research stage involves the comprehension of consumers' perception of HWGMs in countries where hunting is practiced as a recreational activity. To the best of our knowledge, no previous study focused its attention on synthesizing current findings, i.e., no systematic review of the literature has ever been done on this topic. To answer the research question, under the supervision of my Ph.D. tutor Professor Anna Gaviglio (together with colleagues Professor Eugenio Demartini and Doctor Maria Elena Marescotti) I organized a literature review on this specific theme. The hypothesis behind this work is that consumers' perception of HWGM can be linked to different categories of key variables and factors explored by the current literature. Therefore, the categories into which key variables and factors may fall are assumed to be:

- Socio-demographic variables: this category includes those key variables and factors that are related to the socio-demographic characteristics of the samples considered in the studies (e.g., gender, age, and residence)
- Supply-chain related variables: this category includes those key variables and factors that are related to the production method, i.e., hunting activity (e.g., attitude towards hunting, hunting ethics: animal welfare and environment)
- Product-related variables: this category includes those key variables and factors that are related to the product, i.e., HWGM (e.g., perceived safety, perceived healthiness).

Stage 2: The role of the hunters as primary producer: exploring the existence of Optimistic Bias among Italian hunters

What is the Italian hunters' knowledge and perception of risk connected to the implementation of HWGM safety-related practices? What are the possible correlations of these variable with the Optimistic Bias?

The hypothesis behind this choice is that a hunter who practices this activity for recreational purposes may underestimate the risk related to bad handling practices in the early phases of the supply chain seems conceivable. Therefore, we implemented a quantitative study to discover the presence of a cognitive bias called Optimistic Bias (OB), which may act as a factor that influences the level of risk in food handling practices. Taking a cue from the literature that previously studied this phenomenon in food handlers, using a quantitative survey designed using Qualtrics®, a sample of 408 hunters has been reached, and the presence of OB was assessed.

Stage 3: Rethinking hunting in the postmodern era

How hunters are re-framing their identities in the postmodern society?

More specifically, this stage has focused on a Swiss case study, the Grisons canton, where I conducted a series of interviews in the field (Val Bregaglia, CH) to gain knowledge on a peculiar and emblematic western hunters' community used as a context for the analysis, under the supervision of Professor Michael Gibbert and with the collaboration of Doctor Lisa März, from the Faculty of Communication, Culture and Society of USI (Università Della Svizzera Italiana, Lugano, CH). This phase of the research began in July 2021 and finished in November 2022. This stage of the research is framed within my collaboration with USI, as a part of the activities carried out during my period of collaboration with a foreign institution. The study is based mainly on fieldwork, which included in-depth interviews with Swiss hunters: this exploratory investigation was conducted with qualitative methodology.

References

- Alonso M.E., J. R. González-Montaña, e J. M. Lomillos, «Consumers' Concerns and Perceptions of Farm Animal Welfare», *Animals*, vol. 10, n. 3, pag. 385, feb. 2020, doi:10.3390/ani10030385.
- Bekker J.L., L.C. Hoffman, P.J. Jooste Knowledge of stakeholders in the game meat industry and its effect on compliance with food safety standards *International Journal of Environmental Health Research*, 21 (5) (2011), pp. 341-363, 10.1080/09603123.2011.552715
- Buddle E., H. Bray, e R. Ankeny, «“I Feel Sorry for Them”: Australian Meat Consumers' Perceptions about Sheep and Beef Cattle Transportation», *Animals*, vol. 8, n. 10, pag. 171, ott. 2018, doi: 10.3390/ani8100171.
- Bureš D., «Quality attributes and composition of meat from red deer (*Cervus elaphus*), fallow deer (*Dama dama*) and Aberdeen Angus and Holstein cattle (*Bos taurus*)», *J Sci Food Agric*, pag. 8, 2014.
- Carlsson F., P. Frykblom, e C. J. Lagerkvist, «Consumer willingness to pay for farm animal welfare: mobile abattoirs versus transportation to slaughter», *European Review of Agricultural Economics*, vol. 34, n. 3, pagg. 321–344, ago. 2007, doi: 10.1093/erae/jbm025.
- Demartini E., D. Vecchiato, T. Tempesta, A. Gaviglio, e R. Viganò, «Consumer preferences for red deer meat: a discrete choice analysis considering attitudes towards wild game meat and hunting», *Meat Science*, vol. 146, pagg. 168–179, dic. 2018, doi:10.1016/j.meatsci.2018.07.031.
- Fiala M., D. Marveggio, R. Viganò, E. Demartini, L. Nonini, e A. Gaviglio, «LCA and wild animals: Results from wild deer culled in a northern Italy hunting district», *Journal of Cleaner Production*, vol. 244, pag. 118667, gen. 2020, doi: 10.1016/j.jclepro.2019.118667
- Fischer, A., Kereži, V., Arroyo, B., Mateos-Delibes, M., Tadie, D., Lowassa, A., ... & Skogen, K. (2013). (De) legitimising hunting—Discourses over the morality of hunting in Europe and eastern Africa. *Land Use Policy*, 32, 261-270.
- Gaviglio, A., Marescotti, M. E., & Demartini, E. (2018). The local value chain of hunted red deer meat: a scenario analysis based on a northern Italian case study. *Resources*, 7(2), 34.
- Hampton, J. O., & Teh-White, K. (2019). Animal welfare, social license, and wildlife use industries. *The Journal of Wildlife Management*, 83(1), 12-21.

- Hoffman, L.C. e E. Wiklund, «Game and venison – meat for the modern consumer», *Meat Science*, vol. 74, n. 1, pagg. 197–208, set. 2006, doi: 10.1016/j.meatsci.2006.04.005.
- Mahoney, S. P. (2009). Recreational hunting and sustainable wildlife use in North America. *Recreational hunting, conservation and rural livelihoods: Science and practice*, 266-281.
- Marescotti M.E., V. Caputo, E. Demartini, e A. Gaviglio, «Consumer preferences for wild game cured meat label: do attitudes towards animal welfare matter?», *International Food and Agribusiness Management Review*, vol. 23, n. 4, pagg. 599–618, nov. 2020, doi: 10.22434/IFAMR2019.0203.
- Marescotti, E., V. Caputo, E. Demartini, e A. Gaviglio, «Discovering market segments for hunted wild game meat», *Meat Science*, vol. 149, pagg. 163–176, mar. 2019, doi: 10.1016/j.meatsci.2018.11.019.
- Marescotti, M. E., Demartini, E., Gibbert, M., Viganò, R., & Gaviglio, A. (2021). Disentangling individual phases in the hunted vs. farmed meat supply chain: Exploring hunters' perceptions in Italy. *Foods*, 10(1), 174.
- Mehmood, S., Zhang, D., & Armstrong, J. (2003). Factors associated with declining hunting license sales in Alabama. *Human Dimensions of Wildlife*, 8(4), 243-262.
- Minnis, D. L. (1997). The opposition to hunting: a typology of beliefs. In *Transactions of the North American Wildlife and Natural Resources Conference* (Vol. 62, pp. 346-360). Wildlife Management Institute.
- Rule D.C., K. S. Broughton, S. M. Shellito, e G. Maiorano, «Comparison of muscle fatty acid profiles and cholesterol concentrations of bison, beef cattle, elk, and chicken1», *Journal of Animal Science*, vol. 80, n. 5, pagg. 1202–1211, mag. 2002, doi: 10.2527/2002.8051202x.
- Sanchez-Sabate, Badilla-Briones, e Sabaté, «Understanding Attitudes towards Reducing Meat Consumption for Environmental Reasons. A Qualitative Synthesis Review», *Sustainability*, vol. 11, n. 22, pag. 6295, nov. 2019, doi: 10.3390/su11226295.
- Segovia-Siapco, G. e J. Sabaté, «Health and sustainability outcomes of vegetarian dietary patterns: a revisit of the EPIC-Oxford and the Adventist Health Study-2 cohorts», *Eur J Clin Nutr*, vol. 72, n. S1, pagg. 60–70, lug. 2019, doi: 10.1038/s41430-018-0310-z.
- Tomasevic I. et al., «Consumers' perceptions, attitudes and perceived quality of game meat in ten European countries», *Meat Science*, vol. 142, pagg. 5–13, ago. 2018, doi: 10.1016/j.meatsci.2018.03.016.

Tomasevic, I. et al., «Attitudes and beliefs of Eastern European consumers towards piglet castration and meat from castrated pigs», *Meat Science*, vol. 160, pag. 107965, feb. 2020, doi: 10.1016/j.meatsci.2019.107965

Verbeke, W. A., & Viaene, J. (2000). Ethical challenges for livestock production: Meeting consumer concerns about meat safety and animalwelfare. *Journal of Agricultural and Environmental Ethics*, 12, 141-151.

Viganò R. et al., «Quality parameters of hunted game meat: Sensory analysis and pH monitoring», *Ital J Food Safety*, vol. 8, n. 1, mar. 2019, doi: 10.4081/ijfs.2019.7724.

Webster A.J.F, «Farm Animal Welfare: the Five Freedoms and the Free Market», *The Veterinary Journal*, vol. 161, n. 3, pagg. 229–237, mag. 2001, doi: 10.1053/tvjl.2000.0563.

Willett, W et al., «Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems», *The Lancet*, vol. 393, n. 10170, pagg. 447–492, feb. 2019, doi: 10.1016/S0140-6736(18)31788-4.

CHAPTER II

Consumers' perceptions and attitudes toward hunted wild game meat in the modern world: A literature review

Annafrancesca Corradini¹ *, Maria Elena Marescotti¹, Eugenio Demartini¹, Anna Gaviglio¹

¹Department of Veterinary Medicine and Animal Science (DIVAS), University of Milan, Italy, Via dell'Università, 6, 26900 Lodi, LO, Italy

Abstract

Hunted wild game meat (HWGM) has a complete nutritional profile, and its environmental impact is lower than farmed meat. However, HWGM derives from hunting, which often relates to consumers' ethical concerns. This review aims to clarify which variables are linked to consumers' perceptions and attitudes toward HWGM. Results highlight that the body of literature about this topic is growing, especially in Europe and U.S. Moreover, gender and residence seem to be good predictors of consumers' perceptions and attitudes toward HWGM. Furthermore, some positive drivers were detected. The positive attitude toward hunting and familiarity with hunting resulted to be linked to HWGM consumption. Conversely, food safety consumers' concerns represent one of the main barriers. Finally, the seasonality of the product and the relative lack of HWGM market supply represent barriers to its consumption. Our findings may assist stakeholders in defining targeted marketing strategies and policies.

1.Introduction

Although hunted wild game meat (HWGM) plays a residual role in developed countries (FAOSTAT, 2020; Farouk et al., 2021), it possesses great social and cultural value and is raising growing interest in modern world (Arnett & Southwick, 2015; Fagarazzi, Sergiacomi, Stefanini, & Marone, 2021; Gaviglio, Demartini, & Marescotti, 2017; Schulp, Thuiller, & Verburg, 2014). The link with historical and culinary traditions is one of the positive attributes of this product, which has been described by (Hoffman & Wiklund, 2006) as the ‘meat for the modern consumer’, and it has been proven to be an interesting substitute for conventional meats such as beef and pork (Demartini et al., 2021; Demartini, Vecchiato, Tempesta, Gaviglio, & Vigano, 2018; Marescotti, Caputo, Demartini, & Gaviglio, 2020). The HWGM, in fact, can respond to the ethical, health, and environmental concerns raised by intensive livestock production. With regard to the ethical dimension, HWGM comes from animals that were born and raised in free conditions until the harvesting moment; thus, the level of animal welfare of hunted wild animals has been considered higher than that of conventional livestock (Marescotti et al., 2020; Olson, 2014). In this sense, a correct hunting procedure can solve the heated public and scientific debate around the respect for animal welfare along conventional meat production supply chains (Carlsson, Frykblom, & Lagerkvist, 2007; Shaw et al., 2011; Ramanzin et al., 2010; Hampton, Hyndman, Allen, & Fischer, 2021). Furthermore, while it is widely known that consumers recognize healthiness as a fundamental attribute of foods, especially referring to meat products (Harguess, Crespo, & Hong, 2020; Stoll-Kleemann & Schmidt, 2017), HWGM presents valuable nutritional characteristics. Generally, such meats present high-quality protein and low-fat content, with an optimal fatty acid composition (Cockram et al., 2011; Bureš, Barton, Kotrba, & Hakl, 2015; Valencak, Gamsjäger, Ohrnberger, Culbert, & Ruf, 2015; Vigano et al., 2019). Finally, even if

the evidence is still limited, a study conducted in Italy by Fiala et al. (2020) estimated that the greenhouse gas emissions due to HWGM production are approximately one-third of those emitted in beef farming. On the other hand, negative attributes of HWGM also must be mentioned. For instance, wild game meat procurement implies hunting, which, in developed countries, is one of the most controversial activities and has been labeled cruel because of the purported violations of the right to life of wild animals (Shaw, 1973; Dickson, Hutton, & Adams, 2009; Hutton, Adams, & Dickson, 2009). Moreover, evidence from specialized literature reports that even if HWGM in most cases is safe (Membr'e, Laroche, & Magras, 2011; Paulsen & Winkelmayr, 2004), different levels of slaughtering and meat handling skills are present within hunters' communities. This suggests that HWGM may present different levels of microbiological hygiene and commercial quality, especially linked with hunters' training (Gaviglio et al., 2017; Marescotti, Demartini, Gibbert, Vigano, & Gaviglio, 2021; Ranucci et al., 2021). Given its characteristics, comprehending HWGM consumption patterns in developed countries may contribute to assessing the role of this product in human diets and exploring its market opportunities; however, a systematic review of consumers' perceptions and attitudes toward hunted wild game meat has not been presented thus far. The seminal review by (Hoffman & Wiklund, 2006) first highlighted how South African wild game meat responds to consumers' demand for high quality foods. A few years later, a second relevant contribution was presented by (Ramanzin et al., 2010), who collected similar evidence with a keen focus on the Italian case study. Finally, a review by Hoffman and Cawthorn (2012) aimed to quantify the relative importance of HWGM in diets compared to that of conventional meats worldwide. While these reviews greatly contributed to the literature, they focused mainly on the strengths and weaknesses of HWGM production methods and their nutritional and microbiological characterizations. This meant that the insights from studies specifically focused on consumers' perception of HWGM and consumption behavior were basically omitted. Furthermore, the literature on HWGM consumption has expanded considerably since those publications. Given the

increasing attention of researchers toward HWGM in recent times, there is an urgent need to collect and review the current scientific knowledge about consumers' perceptions and attitudes toward HWGM in developed countries. With the present systematic review, we thus intend to respond to the following questions. What do consumers think about HWGM? What are the variables related to consumer perceptions and attitudes toward HWGM? By answering these questions, the present study aims to offer synthetic and exhaustive information to (i) policymakers responsible for hunting and HWGM supply chain management; (ii) private companies involved in HWGM commercialization; and (iii) researchers interested in the topic.

2. Methodology

2.1. Study design and search strategy

To retrieve the literature for the present review, a systematic approach was followed. This method was chosen to capture as many records as possible in the literature regarding consumers' stated consumption, perceptions, and attitudes toward HWGM. In fact, according to Hagen-Zanker & Mallett, 2013, orthodox reviews tend to start and focus on studies already known by the authors; the unavoidable result may be that some studies are overcited and many relevant papers might be involuntarily omitted. This approach creates a persistent bias in the studies that undermines the trustworthiness of the reviews' outcomes (Hagen-Zanker & Mallett, 2013; Mallett, Hagen-Zanker, Slater, & Duvendack, 2012). To avoid the risk of such bias, the PRISMA method (Preferred Reporting Items for Systematic Reviews and Metanalyses), integrated with guidelines given by Hagen-Zanker and Mallett (2013) was used in the present review. PRISMA is a transparent, rigorous, and replicable protocol to identify the relevant papers in the scientific database and synthesize their findings. The search was carried out from January–February 2021 on four major academic databases selected by the research team: Web of Science Core Collection®, CABI®, Scopus® and Food Technology and Science®. The search strings, reported in

Table 1, were adapted to each selected database by using Boolean operators and other variables according to the specific required language. Specifically, the terms ‘game meat’, ‘wild meat’ and ‘wildmeat’ in association with ‘consum*’ (‘consumers’, ‘consumer surveys’, ‘consumer satisfaction’, ‘consumer preferences’, ‘consumer behavior’, ‘consumer attitudes’) were used to find the relevant papers for the present review. It is worth emphasizing that the term ‘bushmeat’ also has been included in the search string, because it is often used as a synonym for HWGM, while the term ‘hunted’ has been excluded, since ‘game meat’ and ‘wild game’ were evaluated sufficiently robustly by the research team as standalone terms to capture all the papers needed for the literature analysis. The inclusion and exclusion criteria were settled by the research team as reported in Table 2. Considering that, to the best of our knowledge, this is the first systematic review focused on consumers’ perceptions and attitudes toward HWGM, an undefined time span was established (which means that all papers published until February 2021 were considered). Finally, only peer-reviewed articles written in English were included in the analysis, while relevant material located outside of peer-reviewed sources, often referred to as ‘gray literature’, was excluded. Ethical approval is not applicable for this article.

Table 1. Search strings used for selected databases

	Database	Search string
Web of Science Core Collection		ts=(((game or wild) near/2 meat\$) or wildmeat\$ or bushmeat\$) AND ts=consum*
CABI: CAB Abstract® and Global Health ®		DE=(game meat OR bushmeat OR wild meat OR wildmeat) OR ts=(((game OR wild) near/2 meat\$) OR bushmeat\$ OR wildmeat\$ DE=(consumers OR consumer surveys OR consumer satisfaction OR consumer preferences OR consumer behaviour OR consumer attitudes) OR ts=consum*
Scopus		(TITLE-ABS-KEY (consum*)) AND ((TITLE-ABS-KEY (game PRE/1 meat)) OR (TITLE-ABS-KEY (wild PRE/1 meat*)) OR (TITLE-ABS-KEY (wildmeat* OR bushmeat*)))
Food technology and Science		consum\$.ti, ab and (((game or wild) adj1 meat\$)or wildmeat\$ or bushmeat\$) ti, ab.

Table 2. Inclusion and exclusion criteria for papers' selection

Criteria	Inclusion	Exclusion
Time span,	All	None
Language	English	Other
Focus	Agricultural economics, marketing and consumer science - Consumer and hunted wild game meat	Other
Publication type	Full text paper published in peer-reviewed journal	Non-peer-reviewed sources Dissertation /theses and articles that do not present primary research studies (conference papers and abstracts, opinions)

2.2 Paper selection, eligibility criteria and variable categorization

The search strings retrieved 2,558 records that were exported in EndNote software (Clarivate Analytics, Philadelphia, PA, US). As shown in Fig. 1, in the first step, the duplicates were removed by an inbuilt function of the software, which resulted in 1,856 unique papers. Based on records' titles and abstracts, papers that (i) did not represent peer-reviewed material or analyze secondary data (e.g., reviews); (ii) did not belong to the agricultural economics, marketing, or social science fields; or (iii) focused on communities where wild game meat represents a subsistence resource – i.e., only research conducted in developed countries were considered in the analysis - were excluded during the second and third screenings. Then, three members of the research team independently analyzed the remaining 89 papers on a full-text basis. At the end of a collaborative discussion among the research team members, 25 papers were finally included in the review. Some papers were excluded because the read of the full paper clarified that the research was conducted in developing countries and HWGM was used by local communities as a subsistence resource, or focused on farmed animals (e.g., farmed deer). Once the paper selection was done, the research team discussed the codification of the variables related to the consumers' perceptions and attitudes toward HWGM found in the selected studies. Thus, the variables were

categorized into three main groups: sociodemographic variables, supply chain-related variables and product-related variables. A further in-depth discussion led to a more precise codification of the variables. The result of the codification process is reported in Fig. 2, where a summary of the variables treated by each paper also is provided, including the following:

- six sociodemographic variables, including gender, residence, age, income, ethnicity and education;
- nine supply chain-related variables, divided into the three subcategories of hunting, which includes familiarity with hunting, beliefs and attitudes toward hunting and production method knowledge; ethics, which includes animal welfare and environmental concerns and wildlife value; and purchase, which includes point of purchase, seasonality, market availability, and occasion of consumption; and
- six product-related variables, divided into the three subcategories of safety and healthiness, which includes perceived safety and perceived healthiness; experience attributes, which includes sensory characteristics and ease of cooking; and extrinsic attributes, which includes origin and price.

Figure 1 – Paper selection using PRISMA method: flow diagram

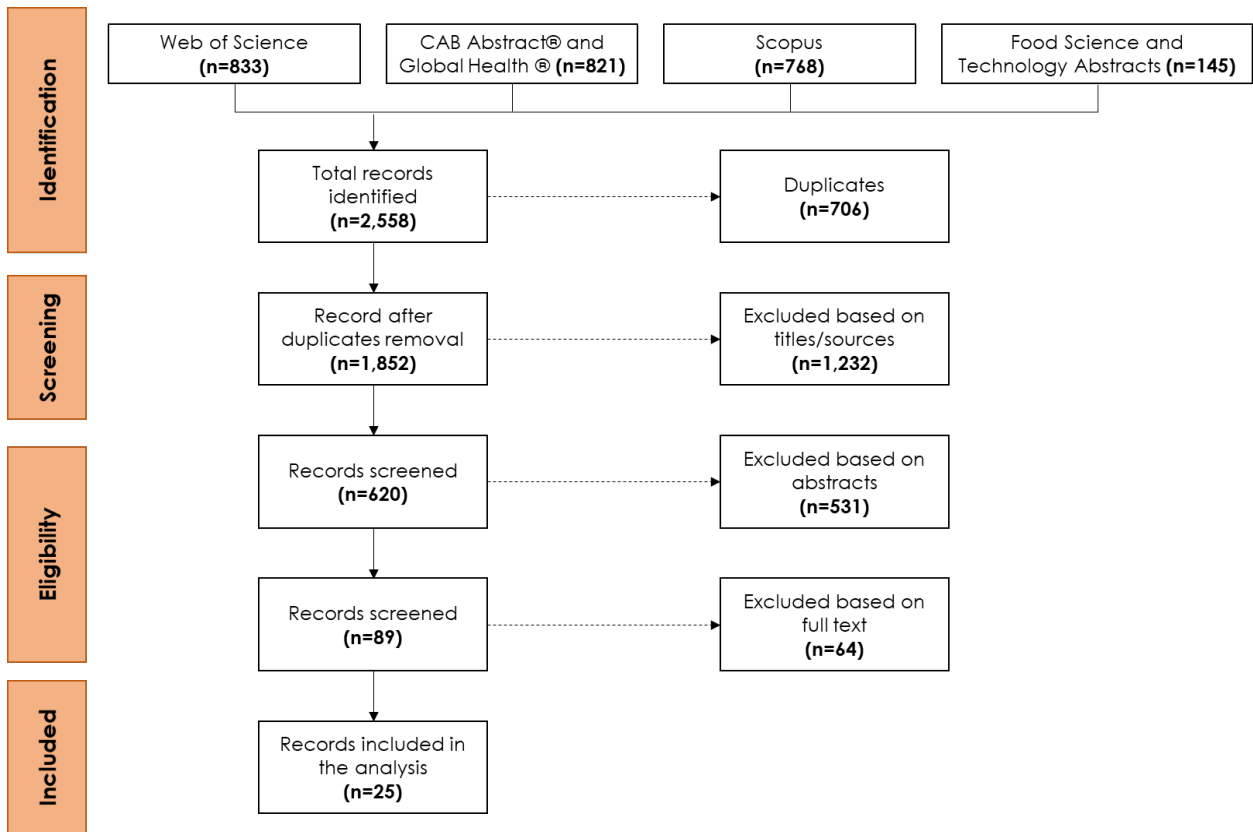


Figure 2 - Categories of variables identified in the examined literature and related papers



3.Results

3.1 General overview of the included studies

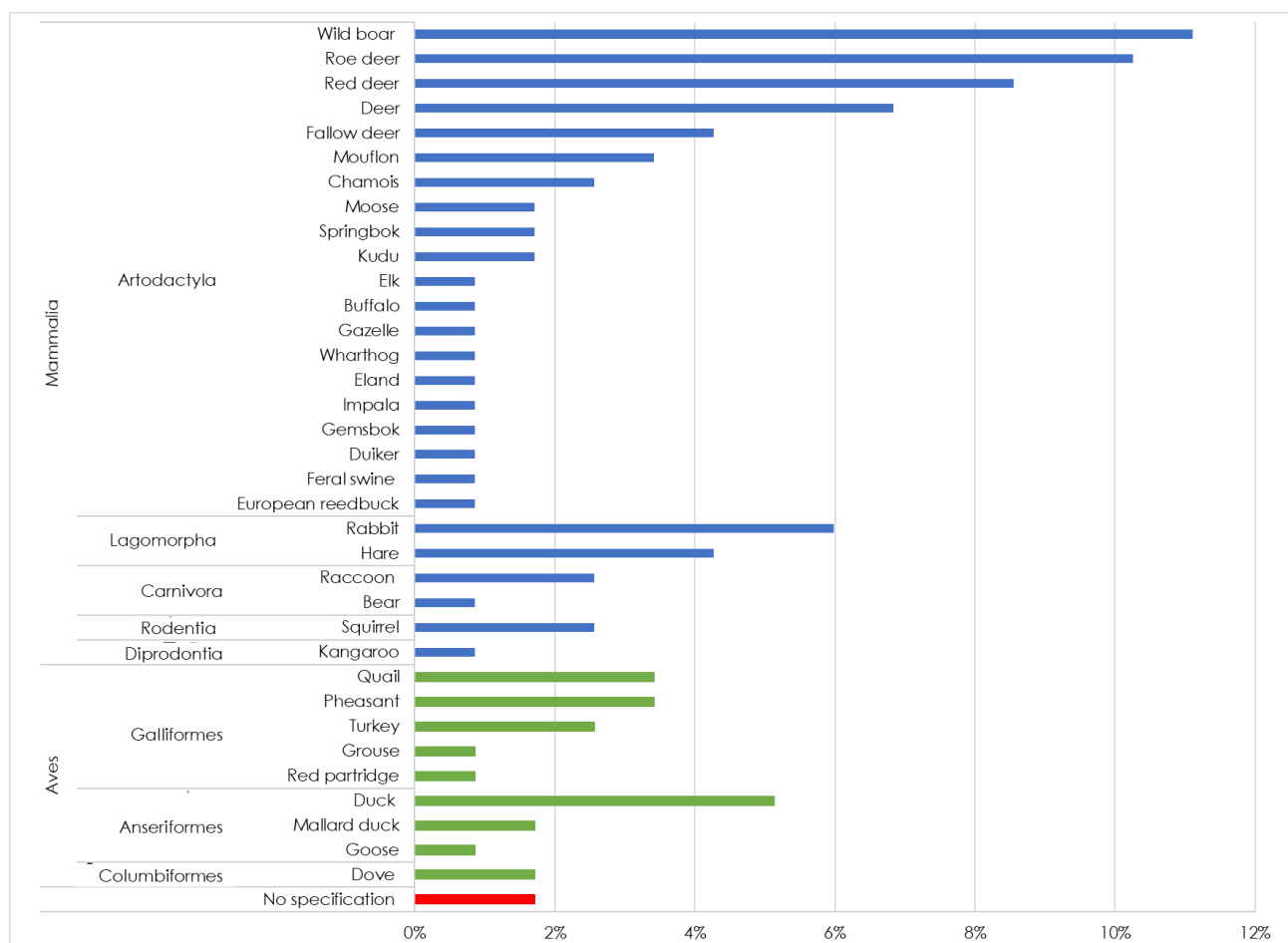
The final pool of papers is composed of 25 papers whose content is summarized in Appendix A. Although the time span was undefined, only recent papers appear in the literature. The publication period, in fact, goes from 2000 to 2021, while most of the articles are dated after 2010 (72.0%), which seems to confirm the growth of interest around this topic from the academic community. The papers analyzed are distributed across three continents: North America (12.0%), Africa (20.0%) and Europe (68.0%). The sample size of the investigations varies across publications; the smallest sample consists of 40 participants, while the largest sample consists of 5807 participants. Most of the studies include regular adult consumers (40.0%), meaning those with peculiar features, while other papers consider specific categories of consumers, such as attendants to outdoor activity fairs (Burger, 2000; Burger & Gochfeld, 2002), tourists (Hoffman, Crafford, Muller, & Schutte, 2004), heads of household (Hoffman, Muller, Schutte, Calitz, & Crafford, 2005), attendants to scientific events (Krokowska-Paluszak et al., 2020), experts (Bodnar & Szel, 2014) or unexpert students or supply chain stakeholders (Bekker, Hoffman, & Jooste, 2011). Next, a noteworthy element is that in studies from Sevillano Morales et al. (2018) and Marescotti et al. (2021), samples are composed totally or partially of hunters, whereas Ljung, Riley, Heberlein, and Ericsson (2012); Ljung, Riley, and Ericsson (2015) and Krokowska-Paluszak et al. (2020) exclusively involve adult consumers who had not hunted in the previous 12 months preceding the survey. Moreover, other authors, such as Tomasevic et al. (2018) and Niewiadomska et al. (2020), prefer to consider only those who declared to consume HWGM, whereas Marescotti et al. (2020) consider those who declared to have eaten HWGM in the previous three months before the questionnaire administration. Finally, the review of the methodological approaches used in the papers shows that most of the papers (92.0%) apply quantitative methods, whereas one

of them uses qualitative text analysis (Radder & Grunert, 2009) and another applies a mixed methodology, using a qualitative in-depth interview followed by a quantitative survey (Bekker et al., 2011).

3.1.1. Consumer-stated consumption and preferences for hunted wild game meat

The review shows that different types of animals are defined as hunted wild game meat in the pool of papers selected (Fig. 3).

Figure 3 - Percentage of papers mentioning each wild species



Most papers consider wild game species only those that belong to the class of mammals (60.0%), while ten papers consider both mammals and birds. It is worth emphasizing that the species are not specified in two papers where general

descriptions such as ‘African wildlife meat’ and wildlife meat’ or ‘various species’ are provided (Bekker et al., 2011; Radder & Grunert, 2009). Where declared, the species belong to eight orders. Five orders of mammals are examined, namely, Artiodactyl (60.7%), Lagomorpha (10.3%), Carnivora (3.4%), Rodentia and Diprotodonts (2.6% and 0.8%, respectively), whereas only three orders of birds are represented, namely, Anseriformes (7.7%), Galliformes (11.1%) and Columbiformes (1.71%). The most frequently mentioned species are wild boar (11.1%), roe deer (10.3%) and red deer (8.6%). However, the term ‘deer’ is frequently used (6.8%) to refer to species belonging to the Cervidae family (Burger, 2000; Burger & Gochfeld, 2002; Goguen & Riley, 2020; Hartmann & Siegrist, 2020; Hoffman et al., 2004; Niewiadomska et al., 2020; Tomasevic et al., 2018). Considering small game, ‘rabbit’ (5.9%) (Burger, 2000; Burger & Gochfeld, 2002; Goguen & Riley, 2020; Niewiadomska et al., 2020; Sevillano Morales et al., 2018; Tolušić et al., 2006; Tomasevic et al., 2018) and ‘duck’ (5.1%) (Burger, 2000; Burger & Gochfeld, 2002; Goguen & Riley, 2020; Hartmann & Siegrist, 2020) are the two most frequently mentioned species. Here, too, the authors use the terms ‘rabbit’ and ‘duck’ as common names to refer to an animal belonging to the Lagomorpha and Anatidae family, respectively. Obviously, the geographical and cultural contexts in which the studies have been carried out justifies the heterogeneity of the species that are considered in the studies. In this connection, Fig. 3 shows that the least mentioned species are distinctly African ungulates, e.g., gemsbok or impala (Hoffman et al., 2004). In this sense, it also can be observed that studies that have been conducted in North America included species that are traditionally hunted in specific areas, such as raccoon (which is traditionally hunted in the Midwest), squirrel (traditionally hunted in Mississippi) or bear (northern states). Among the studies reviewed, 56.0% investigate the frequency of consumption of HWGM. It is relevant to highlight that some studies reported the presence of consumers who had never tasted HWGM in their lives in the sample (Bodnar, Hodi, & Bodnar, 2014; Bodnar & Szel, 2014; Goguen & Riley, 2020; Hoffman et al., 2004; Krokowska-Paluszak et al., 2020; Ljung et al., 2015), whereas all the studies reported frequencies of consumption of at

least once a year for the majority of consumers surveyed. Considering the countries in which investigations have been carried out, the most consumed species in the US (Burger, 2000; Burger & Gochfeld, 2002; Goguen & Riley, 2020) and Spain (Sevillano Morales et al., 2018) were deer and red deer, respectively. Moreover, differences in species consumption subsist among European countries. Italian consumers declared that they consume mostly wild boar (Demartini et al., 2021; Marescotti et al., 2021), whereas Hungarian consumers declared that they eat mostly roe deer (Bodnar, Bodnarne Skobrak, Tanacs, & Pinnyey, 2011). Finally, two studies collected data on consumers' preferences for game meat (Bodnar et al., 2014; Bodnar & Szel, 2014) and suggested that European consumers prefer wild boar among the species considered.

3.2 Consumers' perceptions and attitudes toward hunted wild game meat

3.2.1. Sociodemographic variables

According to the review, consumers' gender is the most investigated sociodemographic variable for which significant results are reported (44.0% of the studies), followed by age (20.0%), residence (20.0%), income (16.0%), ethnicity (12.0%), and education (8.0%). Studies that investigated gender found differences between male and female participants in terms of stated HWGM consumption (Goguen & Riley, 2020; Niewiadomska et al., 2020; Tomasevic et al., 2018), consumption frequency (Ljung et al., 2015; Tolusic et al., 2006; Tomasevic et al., 2018), declared consumed species (Burger & Gochfeld, 2002), consumption preferences (Bodnar, Benak, & Bodnarne Skobrak, 2010) and attitudes toward HWGM (Bodnar et al., 2014; Marescotti, Caputo, Demartini, & Gaviglio, 2019) and hunting (Krokowska-Paluszak et al., 2020). Overall, the results suggest that male consumers show a more positive attitude toward HWGM and hunting than female consumers and eat this product more frequently. Furthermore, in Goguen and Riley (2020), Ljung et al. (2012, 2015); Niewiadomska et al. (2020); and Tomasevic et al. (2018), the residence variable is explored. In these papers, the stated consumption of

HWGM between respondents living in rural or urban areas is compared: the results suggest that a lower level of urbanization may positively influence HWGM consumption. Moreover, Tomasevic et al. (2018) present a cross-cultural investigation conducted in ten Eastern European countries (i.e., Albania, Bulgaria, BosniaHerzegovina, Czech Republic, Croatia, Macedonia, Montenegro, Serbia, Slovakia and Poland) that reports that the frequency of HWGM consumption is higher in Southeastern Europe than in Central Europe (especially in Bulgaria, where HWGM is reported to be consumed at least once a month by almost 80.0% of respondents). Considering consumers' age, the results reveal that younger consumers consume less HWGM than older consumers (Bodnar et al., 2014; Burger & Gochfeld, 2002; Krokowska-Paluszak et al., 2020; Ljung et al., 2015; Tomasevic et al., 2018). In this respect, it may be notable to look at the results reported by Burger and Gochfeld (2002) where in contrast to the other classes of participants, middle-aged consumers (35–45 years) declare that they eat less common wild species such as doves, raccoon, and squirrel. However, it also is interesting to see the results of Krokowska-Paluszak et al., (2020) in which the attitude toward hunting is studied and where a more positive attitude is revealed in young male participants (<40 years). HWGM consumption also is related to consumers' income. On average, the review suggests that income is positively related to consumption and attitudes toward HWGM. For instance, the results from Tolušić et al. (2006) reveal that HWGM is perceived as expensive by Croatian consumers, who declare that they can afford HWGM only once a month. Moreover, Marescotti et al. (2019) found income differences among identified clusters of HWGM Italian consumers, highlighting that higher household income consumers show more positive attitudes toward HWGM. This evidence also is confirmed in the Swedish context by Ljung et al. (2015) where the analysis highlights that income is the sociodemographic variable that has the greatest effect on HWGM consumption frequency, especially in urban contexts where higher-income households tend to consume more HWGM than lower-income households. In contrast, the survey conducted by (Burger & Gochfeld, 2002) in the United States suggests that the

consumption of squirrel and racoon is related to lower income, which suggests that hunting activity still represents a feasible way to procure meat for underprivileged people. Furthermore, considering ethnicity, the results show that in the United States (Burger & Gochfeld, 2002; Goguen & Riley, 2020) and South Africa (Hoffman et al., 2005), Caucasian people seem to consume more HWGM than other ethnic groups. Finally, concerning education, consumers with higher education tend to consume more HWGM (Niewiadomska et al., 2020) and to have a positive attitude toward it (Marescotti et al., 2019).

3.2.2. Supply chain-related variables

According to the review, two of the most studied variables fall in the category labeled 'hunting'. More specifically, the most explored variable is familiarity with hunting (36.0% of the studies) and beliefs and attitude toward hunting (28.0%). These are followed by animal welfare and environment (28.0%), which falls in the 'ethics' category, and point of purchase (16.0%), market availability (16.0%), occasion of consumption (16.0%) and seasonality (12.0%), which fall in the 'purchase' category. The less explored variables are wildlife value (12.0%) and production method knowledge (8.0%), which fall into the 'ethics' and 'hunting' categories, respectively.

3.2.2.1. Hunting.

The variable familiarity with hunting includes all the studies that explored consumers' hunting-related experiences, both in terms of direct (e.g., consumer is a hunter) and indirect experiences (e. g., consumer has relatives or friends who hunt). Considering the direct experience with hunting, four studies based on the Hungarian context report that a considerable number of the consumers interviewed also declared that they hunt (Bodnar et al., 2010; Bodnar et al., 2011; Bodnar et al., 2014; Bodnar & Szel, 2014). In these studies, the authors note that hunters are overrepresented in the samples compared to the number of hunters in the Hungarian population and declare that they consume a wider variety of species of HWGM and more frequently than nonhunters. This correlation is confirmed by Sevillano Morales et al. (2018) who statistically

verify that being a hunter is a factor positively correlated with HWGM consumption in Spanish consumers. Furthermore, considering consumers' indirect experience with hunting, Burger et al. (2000) report that in their study, respondents who declare that they have never hunted nevertheless mention having the occasion to consume HWGM as a 'courtesy of their friends and family'. More recent surveys confirm the role of indirect experience with hunting in association with HWGM consumption (Ljung et al., 2012, 2015; Sevillano Morales et al., 2018; Niewiadomska et al., 2020; Goguen & Riley, 2020). Specifically, Ljung et al. (2012,2015) and Goguen & Riley, 2020 found that HWGM consumption is positively correlated with having a previous experience with hunting or having a social interaction with hunters (e.g., having a hunter in the household, having a friend or a parent who hunts) in Sweden and the United States, respectively. The papers published by Hoffman et al. (2004) and Hoffman et al. (2005) first emphasized the importance of considering consumers' beliefs and attitude toward hunting in the studies related to HWGM. Specifically, the results from the first study reveal that most of the sample of tourists interviewed had a positive opinion about wild game culling, whereas the results from the second study show that South African consumers had more conflicted opinions on this topic. Regardless of the differences found in the answers obtained by the two different samples, the authors suggested that consumption and attitudes toward HWGM might correlate with consumers' beliefs or attitudes toward hunting. Unfortunately, no statistical analysis was provided to test this relationship. Other authors addressed the issue later. In this sense, the study of Ljung et al. (2012) proposes a psychometric scale of nine items referring to hunting activity and hunters' behavior, revealing that, overall, Swedish nonhunters have a positive attitude toward hunting and that HWGM consumption is the best explanatory variable linked to this attitude. The latter findings also are confirmed in Ljung et al. (2015), where attitudes toward hunting appear to be overall positive and positively affected by familiarity with hunting and game meat consumption, especially when hunting is practiced for food purposes. This evidence is in line with what was observed later in the Italian context by Demartini et al. (2018), where more than half of the surveyed

consumers declare that they are positively disposed toward hunting and that this positive disposition increases their willingness to pay (WTP) for HWGM. Similarly, Krokowska-Paluszak et al. (2020) find that Polish consumers have positive attitudes toward hunting, determined first by familiarity with hunting and second by their frequency of HWGM consumption. In direct contrast, Marescotti et al. (2019) found an overall negative disposition toward hunting in Italian consumers. It is interesting to note that this value seems to increase only for those consumers who recognized in this activity some kind of utility, i.e., meat procurement. Finally, two studies have analyzed consumer production method knowledge (Demartini et al., 2021; Marescotti et al., 2019). Interestingly, in Marescotti et al. (2019) objective knowledge about hunting and HWGM was tested combined with other variables. Findings from this study suggest that a lower level of consumer objective knowledge about hunting may act as a barrier to consumption. In light of these findings, Demartini et al. (2021) deepened this issue, focusing their research on the roles of both objective and subjective knowledge about hunting and farming in determining consumers' preferences for both hunted wild boar meat and pork. The results of the research show that the more consumers objectively know about hunting, the more they like HWGM, while the more they know about livestock farming, the less they like conventional farmed meat. However, at the same time, the results reveal that subjective knowledge seems not to be a reliable predictor of preferences for HWGM.

3.2.2.2. Ethics.

Some relevant variables able to explain consumer perception and attitudes toward HWGM relate to the 'ethics' dimension in terms of animal welfare and environment and wildlife value; nonetheless, few studies have explored these topics. With regard to animal welfare and environment, Tolus 'ić et al. (2006) report that most Hungarian consumers consider HWGM to be produced in an 'environmentally friendly' and sustainable way. Similar results are discussed in Marescotti et al. (2021), who found that Italian hunters perceive HWGM as more 'environmentally friendly' and 'ethical'

than farmed meat. On the other hand, Demartini et al. (2018) and Wassenaar, Kempen, and van Eeden (2019) suggest that the perception of HWGM is heterogenous among consumers and show that Italians and South Africans dislike HWGM because they perceive hunting activity as negative for the environment. Consumers' concerns about animal welfare issues related to HWGM consumption are explored in three papers. Findings from Marescotti et al. (2019, 2020) highlight that Italian consumers are generally sensitive to animal welfare, highlighting that the more consumers care about this issue, the more they show a negative disposition toward HWGM consumption. The relationships between animal welfare perception and consumption of HWGM are not confirmed by the survey conducted by Wassenaar et al. (2019), who report that both South African consumers and nonconsumers of HWGM believe that game meat possesses the 'animal welfare attribute'. Finally, considering consumers' ethical concerns related to HWGM production method ethics, Hartmann & Siegrist, 2020 reveal that German consumers consider HWGM procurement to be more morally justifiable than intensive animal and fish farming. Finally, consumers' orientations toward wildlife value are explored in three papers. Specifically, Hoffman et al. (2004) and Radder and Grunert (2009) first report that some consumers feel uncomfortable eating wild animals culled from their environment. These results are confirmed in Marescotti et al. (2019), where a cluster analysis revealed that a strong wildlife value orientation can be identified in consumers who do not consume HWGM.

3.2.2.3. Purchase.

The literature review related to the purchase variables allowed us to collect information about the point of purchase, seasonality, market availability, and occasions of consumption of HWGM. Regarding the point of purchase, the analysis of the literature shows that in Europe (Bodnar et al., 2014; Bodnar & Szel, 2014; Tomasevic et al., 2018) and North America (Goguen & Riley, 2020), HWGM is normally purchased or donated by hunters, while in South Africa, consumers report buying it at the butchery (Hoffman et al., 2005). Furthermore, our analysis shows that

the results from Burger and Gochfeld (2002) highlight that some types of HWGM follow a seasonal pattern, since North American consumers involved in this survey declare that they eat more deer in winter months. Similar results can be found in Bekker et al. (2011) and Tomasevic et al. (2018), who report that HWGM is available only during winter in South Africa and is perceived as a seasonal product in Eastern Europe, respectively. Looking at market availability, the analysis shows that HWGM is generally perceived as hard to find in the market (Bodnar et al., 2014; Demartini et al., 2018; Goguen & Riley, 2020; Hoffman et al., 2005; Tomasevic et al., 2018). However, the relationship between perceived market availability and HWGM consumption is not clear. For instance, Bodnar et al. (2014) described the lack of availability as one of the causes of HWGM rejection, while Demartini et al. (2018) found that the lack of market availability was not important for consumers who showed positive attitudes toward HWGM. Finally, with reference to the occasion of consumption, an investigation of tourists in South Africa carried out by Hoffman et al. (2004) reported that most of the sample used to eat wild game at their friends' houses. The same results were found in surveys conducted on a South African sample (Hoffman et al., 2005) and in Croatia (Tolus Ćić et al., 2006), where consumers stated that they eat HWGM at the restaurant or their friends' homes rather than in their own homes.

3.2.3. Product-related variables

According to the review, the most mentioned variables fall into the 'safety and healthiness' category, namely, perceived safety (60.0%) and perceived healthiness (56.0%), followed by sensory characteristics (48.0%) belonging to the 'experience attributes' category, and price (40.0%) categorized in the 'extrinsic attributes' category. Finally, ease in cooking (20.0%) and origin (8.0%) are the less reported experience and extrinsic attributes, respectively.

3.2.3.1. Safety and healthiness.

Considering the variable perceived safety, the review reveals contradictory findings. On the one hand, some studies indicate that most consumers are concerned about HWGM safety (Bekker et al., 2011; Bodnar et al., 2010; Bodnar et al., 2011, 2014; Hoffman et al., 2005; Krokowska-Paluszak et al., 2020; Marescotti et al., 2021; Tolušić et al., 2006). Some of these studies report that consumers fear the presence of pathogens such as the nematode *Trichinella* spp., especially in wild boar meat (Tolušić et al., 2006) (Bodnar et al., 2010), and parasites and *Salmonella* spp. in HWGM (Bekker et al., 2011). It is worth emphasizing that consumers' perception of HWGM safety is sometimes investigated in connection with consumers' trust and beliefs about hunters' compliance with food safety standards and hygienic meat handling practices. In this sense, the results from Bekker et al. (2011) suggest that even if most South African consumers were concerned about HWGM safety, they trusted the HWGM production method and knew that processing plants must comply with basic hygienic regulations. On the other hand, Krokowska-Paluszak et al. (2020) argue that consumers criticize those hunters not following the minimum principles of food safety. In this connection, Marescotti et al. (2021) directly surveyed a sample of Italian hunters who declared that they perceive hunted wild boar meat as less safe to eat than farmed pork. On the other hand, the review reveals that seven papers mention consumers' positive opinions regarding the perceived safety of HWGMs. For instance, Hoffman et al. (2004) report that most of the consumers surveyed believe that HWGM is a BSE-free meat. Furthermore, Ljung et al. (2012) illustrate that Swedish consumers feel that hunters are well trained and adequately follow hunting and food safety rules. Additionally, Bodnar et al. (2014) and Bodnar and Szel (2014) show that few consumers perceive hygienic risk as deriving from HWGM consumption. Similar results are presented in Demartini et al. (2018) and Marescotti et al. (2019), who reveal that Italian consumers generally think that HWGM is safe to eat. Finally, the results from Wassenaar et al. (2019) report that South African HWGM consumers are completely confident about its safety, while nonconsumers have no opinion about this

characteristic. Regarding safety, the perceived healthiness of HWGM has been widely explored in the last two decades. Overall, the studies analyzed show that consumers appear to recognize that HWGM possesses positive nutritional proprieties (Bodnar et al., 2010, 2014; Bodnar & Szel, 2014; Demartini et al., 2018; Hoffman et al., 2004; Hoffman et al., 2005; Marescotti et al., 2019; Marescotti et al., 2021; Niewiadomska et al., 2020; Radder & Grunert, 2009; Tolušić et al., 2006; Wassenaar et al., 2019), with a low content of fat (Hoffman et al., 2004; Hoffman et al., 2005; Marescotti et al., 2019; Tomasevic et al., 2018) and cholesterol (Marescotti et al., 2019; Tomasevic et al., 2018) but a high content of protein and minerals (Bodnar et al., 2010, 2014; Bodnar & Szel, 2014; Tomasevic et al., 2018).

3.2.3.2. Experience attributes.

Given the review process, the sensory characteristics of HWGM emerged as very important attributes for both consumers and nonconsumers. The results from Hoffman et al. (2004) reveal that most of the sample declared that they liked the taste of HWGM. Moreover, Demartini et al. (2018) shows that the cluster of consumers who are disposed to pay more for HWGM recognize a good taste in red deer meat. Similarly, Tomasevic et al. (2018) found that taste and smell are the most valued attributes of HWGM by European consumers. Finally, Marescotti et al. (2020) reports that hunters consider hunted wild boar meat tastier than farmed pork. On the other hand, other studies emphasize the negative role of the typical flavor of HWGM, which is reported as one of the most negative attributes related to HWGM consumption (Hoffman et al., 2005). Furthermore, Radder and Grunert (2009) reported that both groups of surveyed consumers perceive HWGM as 'dry' meat. In line with this, Bodnar et al. (2010) found that Hungarian consumers rate taste as the first reason for rejecting HWGM. Similar findings are reported in other studies (Goguen & Riley, 2020; Niewiadomska et al., 2020; Wassenaar et al., 2019), where nonconsumers rate the sensory characteristics of HWGM as the crucial cause for not eating this product. These findings are confirmed by Niewiadomska et al. (2020), where taste is indicated

as the attribute with the greatest impact on the frequency of HWGM consumption. The ease of cooking of HWGM is one of the less explored variables linked to HWGM consumption. Hoffman et al. (2005) report that most consumers state that they are knowledgeable about how to prepare HWGM; conversely, Radder and Grunert (2009) reported that HWGM is perceived as a product that needs special preparations, suggesting that some consumers avoid purchasing HWGM to prevent culinary disappointment and a decrease in self-esteem. It is worth comparing these results with the cluster analysis presented in Demartini et al. (2018), where the attitudes toward HWGM are negatively related, among other factors, to the perceived difficulties in cooking. Finally, Niewiadomska et al. (2020) find the perceived easiness in cooking to be negatively correlated with the HWGM consumption frequency.

3.2.3.3. Extrinsic attributes.

The origin variable of HWGM appears to be marginally explored in the literature. For instance, Bekker et al. (2011) and Niewiadomska et al. (2020) found that South African and Polish consumers would prefer to buy local HWGM. Similar results were provided by Demartini et al. (2018, 2021), who estimate a consistently increasing willingness to pay for Italian HWGM when compared to a product imported from another European country. The price of HWGM seems to play a prominent role in research that explores consumers' perceptions and attitudes toward HWGM. In fact, the results from Radder and Grunert (2009) reveal that price is considered an important attribute for those who decide to consume game meat, and Bodnar and Szel (2014), Hoffman et al. (2005), Tolušić et al. (2006), Tomasevic et al. (2018) show that consumers perceive HWGM as an expensive meat compared to conventional ones. In a different context, Demartini et al. (2018) found that even if Italian consumers are willing to pay more for beef than for hunted red deer meat, there is a niche of consumers who are positively disposed toward HWGM and would recognize a higher price for red deer meat than for beef. These findings are corroborated by Marescotti et al. (2020), who found heterogeneous preferences and willingness to pay for cured

meat products made with different animal species (hunted red deer, bovine and horse). Finally, the results from Demartini et al. (2021) suggest that higher levels of objective knowledge of hunting have a positive impact on willingness to pay for HWGM.

4. Discussion

Studies on consumers' perceptions and attitudes toward hunted wild game meat confirmed the increasing interest in the product and its positive characteristics that meet consumers' needs for ethical, healthy, and environmental foods. However, the research also highlighted relevant limitations for the development of its market, especially in terms of availability and motives of rejection, such as taste, wildlife value, and perceived safety risks within certain segments of consumers. Despite the studies' heterogeneity in the literature and the differences among countries, the review process identified clear and established trends in HWGM consumption and consumers' attitudes toward the product. These topics will be discussed in this section, extending the debate to relevant literature on hunting and meat consumption and proposing some policy and managerial implications for the future of HWGM consumption.

4.1. The roles of gender and residence in HWGM consumption

Gender was a good predictor of HWGM consumption. The results show that among different Western contexts (Europe and the USA), men eat more HWGM than women and have more positive attitudes toward it and hunting. These results seem consistent with what has been found by Kubberød, Ueland, Rødbotten, Westad, and Risvik (2002), Rothgerber (2013), Love and Sulikowski (2018), Rosenfeld and Tomiyama (2021), who demonstrated that males eat more meat than their counterparts and display more positive attitudes, especially toward red meat in different contexts (Europe, Australia, and the USA); in contrast, female participants are more open to becoming vegetarian and display more negative attitudes toward meat. A plausible interpretation for this phenomenon proposed by the literature is that eating meat makes

men feel like “real men”, suggesting the personal adherence of the majority to one of the hegemonic standards of traditional masculinity (Rosenfeld & Tomiyama, 2021). In this connection, given that HWGM is obtained from hunting and that historically the hunting arena belongs to men (Sumpter, 2015), it may be conceivable to assume an even stronger connection between HWGM consumption and masculinity traits than with conventional meats, especially for certain consumer groups such as hunters themselves. Interestingly, as suggested by Rosenfeld and Tomiyama (2021), gender differences in meat consumption attitudes are more likely to be driven by men’s relationships with masculinity rather than women’s relationships with femininity. In this regard, the authors propose an interpretation of the phenomenon in line with the theory of precarious manhood (Vandello, Bosson, Cohen, Burnaford, & Weaver, 2008), whereby in Western cultures, threatened masculinity (and not femininity) needs to be behaviorally affirmed. In this respect, it could be speculated that consuming HWGM and having more positive attitudes toward hunting or being a hunter could be included in such behaviors. Future research should empirically demonstrate the possible connection between masculinity and hunting and HWGM consumption. Moreover, residence, both in terms of country and urbanization, is a second clear influencing factor of HWGM consumption. The availability of different species in different areas of the world influences the type of HWGM consumed; however, hunting acceptance is a context-dependent variable, and hunting public perception varies among countries and is related to hunting motivation. Most of the literature has explored public perception toward hunting, especially in the USA, whereas European context-based analyses that have been carried out focus more on Northern Europe rather than Mediterranean countries. For example, a recent survey on US samples shows the public positive perception of hunting and that most respondents consider hunting acceptable when it is related to food provision (Byrd, Lee, & Widmar, 2017). Similarly, empirical European context-based analyses conducted in Denmark (Gamborg & Jensen, 2017) and Sweden (Ljung, 2014) reveal a public positive perception of hunting when related to food provision. With regard to urbanization,

even if hunting does not represent a subsistence resource for rural communities in developed countries (Peterson, Hansen, Peterson, & Peterson, 2011), this activity continues to be perceived more positively in such a context compared to urbanities (Mankin, Warner, & Anderson, 1999; Peterson et al., 2011), and being a resident in rural areas is positively associated with HWGM consumption. Two explanations seem conceivable for this relationship. First, in rural contexts, it may be easier to participate in rural activities such as hunting or farming, as previous research has shown. For instance, the results from Heberlein, Ericsson, and Wollscheid (2002) indicate that rurality is the strongest predictor of participation in hunting. Moreover, the results from (Stedman & Heberlein, 2009) show that rurality is strongly related to hunting participation, but they also suggest that “rurality” is particularly contingent on the effects of other variables, such as another sociodemographic variable (e.g., being male) or socialization (e.g., having fathers who hunt). Second, living in rural areas increases the probability of having experienced negative interactions with wild animals and thus supports hunting as a feasible way to solve this issue (Valente et al., 2020).

4.2. The positive drivers of HWGM consumption

Ethical issues stemming from meat production methods are increasingly worrisome to Western consumers, who are increasingly opting for products from supply chains that claim to ensure standards of environmental sustainability and animal welfare. In this respect, our review shows that HWGM satisfies consumers’ expectations regarding these attributes. Specifically, the findings reported here reveal that consumers generally recognize that HWGM production is more environmentally sustainable than farmed meat. This is in line with the contribution of Fiala et al. (2020), who evaluated the environmental impact of red deer hunted meat through the LCA approach and found that HWGM appears to be more environmentally sustainable than conventional meat. Furthermore, European consumers positively valued animal welfare as an attribute related to HWGM. Thus, it seems plausible that the animal welfare attribute

will be evaluated in a positive manner related to HWGM since wild animals, by definition, live free, according to their nature. In this connection, it may be interesting to mention findings from Boaitey and Minegishi (2020) that provide insight into the characteristics of consumers who are concerned with animal welfare. Their review reports the existence of differences in animal welfare perception across countries (USA, Australia, Canada), emphasizing that consumers' interests in animal welfare are generally higher in Europe than in the USA. Boaitey and Minegishi (2020) suggest that such evidence may be due to the lack of studies that focus on other parts of the world, where there might be a lower level of interest in animal welfare. Moreover, the findings suggest that a positive attitude toward hunting (and familiarity with hunting) seems to correlate with HWGM consumption. Considering this, it is interesting to report findings from other studies that have addressed the issue thus far, exploring public attitude toward hunting in different contexts (Byrd et al., 2017; Gamborg & Jensen, 2017). In the European context, Gamborg and Jensen (2017) have shown that Danish participants involved in their study seem to have a generally positive attitude toward recreational hunting. This study confirms that a positive attitude toward hunting is explained by certain sociodemographic characteristics of the participants (older public and rural residents have more positive attitudes) and by having social interactions with hunters. Interestingly, Gamborg and Jensen (2017) do not consider HWGM consumption as a variable linked to attitude toward hunting, although their results highlight a link between such attitude and childhood area of residence. To explain these results, the interpretation given by the authors is that consumption habits established in consumers' early years, or ties to family members or friends, persist among participants who moved to urban areas, where they grow older. Furthermore, similar findings also have been reported by Byrd et al. (2017). In their study, positive attitudes toward hunting have been expressed by the majority of the US sample involved. In contrast to the aforementioned study, here, the authors took the consumption of HWGM into account when assessing attitude toward hunting. Although this study was not retrieved with our research, it is still worth mentioning

that in this sample, people who consider hunting cruel also have never eaten HWGM. Future studies should shed light on the direction of the interaction between HWGM consumption, attitude toward hunting and familiarity with hunting, also considering the role of participants' social interactions with hunters. Such studies also may be useful to design wildlife conservation interventions. In fact, through surveys exploring consumer perceptions and attitudes toward HWGM, information can be gathered on the general public's perception of hunting. This can be relevant since hunting is one of the tools through which wildlife populations are managed: understanding the public perception of this activity is essential to designing new policies, since the public is one of the main stakeholders involved in wildlife conservation.

4.3. The motives for HWGM rejection

Food safety was one of the most challenging issues related to the HWGM supply chain. Among product-related variables, consumers' perception of HWGM safety and healthiness has been found to be largely studied in the literature. The review highlighted contradictory opinions regarding HWGM safety among consumers, even in the same cultural context. Some consumers, both from Europe and South Africa, showed major concerns about well-known foodborne diseases associated with HWGM consumption. In some cases, the perceived inadequate safety levels are associated with poor hunter training, which results in bad handling practices. At the same time, other studies revealed that most surveyed consumers from Europe (Sweden, Hungary, and Italy) and South Africa are generally positive about HWGM safety and hunters' handling abilities. As part of consumers' perceptions, HWGM consumption objectively exposes consumers to some hazards, since bacterial pathogens, parasites, and chemical and foreign objects may contaminate these products (Coburn, Snary, Kelly, & Wooldridge, 2005). Thus, recently, a review published on HWGM safety and hygiene claimed the need for improvement in specific hygienic practices and standards related especially to deer and wild boar (Gomes-Neves, Abrantes, Vieira-Pinto, & Müller, 2021). Moreover, it is worth mentioning that sensory characteristics may act as

a barrier to HWGM consumption. However, studies that explored this attribute do not distinguish whether the sensory characteristics are evaluated on raw or cooked meat even if it is known that different preparations lead to different sensory profiles (Moran, Vivanco, Lorenzo, Barron, & Aldai, 2022). Therefore, further studies dealing with precise sensory analyses on HWGM would be appreciated to extend the knowledge about this issue. Since HWGM derives from wild animals, wildlife value orientation in consumers has been explored. Generally, the literature suggests an erosion of traditional orientation toward wildlife (Manfredo, Teel, & Bright, 2003), describing a public shift from a utilitarian focus (i.e., use of wildlife for human benefits) to a more protectionist orientation, both in Europe and North America (Gamborg & Jensen, 2017; Zinn, Manfredo, & Barro, 2002). This evidence suggests that where wildlife value orientation is strongest in consumers, it might act as a barrier to HWGM consumption. However, we can speculate that the use of HWGM derived from containment plans may be considered more acceptable than the use of HWGM obtained by recreational hunting.

4.4. The seasonality of HWGM and the provision issue

The findings from the review highlight how the lack of market availability and seasonality are the main constraints related to HWGM market development. In fact, HWGM is a limited-supply product, available only during the hunting season, in every region considered in this study. In this respect, even if the attribute ‘seasonality’ is mostly conceptually linked to vegetables and fruits, some considerations also can be drawn also for HWGM. As a result of technological evolution and globalization, almost all foods are available year-round (at least in Westernized countries), although historically, food availability is determined by the seasonality (season of harvesting) of the product itself (Westerterp-Plantenga, 1999). However, as pointed out by Macdiarmid (2014) and Spence (2021) the consumption of seasonal products might contribute to moving toward more environmentally sustainable and healthy consumption patterns, at least when the food is produced locally. With that said, what

if the right promotion strategy transformed the seasonality from a barrier into an advantage? As suggested by Resare Sahlin, Rönöös, and Gordon (2020), a new Western model of meat consumption is currently pursuing the ‘less but better’ principle, essentially for sustainability purposes (social, economic, and environmental). Thus, the scientific community has the duty to communicate to consumers what is ‘less’ and ‘better’. From this perspective, it is interesting to note that HWGM may meet both challenges, as it is a ‘healthy’ product that is available in limited quantities and sustainable in terms of environmental impact. Because of its limited availability and due to its characteristics, HWGMs could meet the needs of the niches of more conscious meat consumers, as endorsed by Hoffman and Wiklund (2006). In this sense, improving the performance of HWGM supply chains may help foster its market at the local level. Moreover, the findings suggest that considering the modality of purchase of HWGM, other regional differences emerged. This means that different territories correspond to different HWGM supply chain organizations, with implications for consumers’ perception of HWGM.

4.5. Policy and managerial implications for HWGM market development

Going into detail and describing the level of development and efficiency of HWGM supply chains in each of the sociocultural contexts considered in this review, is beyond the scope of this paper. However, looking at the results, it is still possible to draw some general conclusions. HWGM objectively possesses positive attributes, but hunting is not always accepted by consumers as a method to produce meat in high income countries. However, what does the consumer know about hunting? Generally, the literature recognizes a link between knowledge and consumer purchasing behavior (Pieniak, Aertsens, & Verbeke, 2010). Thus, further research to explore consumer knowledge about hunting related to HWGM perception in different cultural contexts is suggested. In fact, revealing mechanisms that guide individual choices (especially when studying meat consumption behavior) is essential for policy-makers and marketers to improve hunted product communication strategies. In this sense, since

hunting plays a key role in wildlife management, improving consumers' positive perception about hunting can be useful not only for the promotion of HWGM but also for raising awareness and informing the public about the role of this activity. At the same time, as we expected, the results show that a lack of clear food safety standards and trust in hunters' ability in HWGM handling may have effects on consumers' perception of HWGM safety. Improving procedures to guarantee food safety may benefit supply chain stakeholders transversally in all examined cultural contexts. At the same time, policy-makers should foster the enhancement of safe supply chains and ensure proper hunter behavior through protocols that must be implemented.

4.6. Limitations

Some limitations of the study are worth mentioning. First, given the implied heterogeneous methods and the different definitions provided for HWGMs, the results are difficult to compare. In addition, the findings cannot be generalized, since the context in which the survey/study has been carried out influences consumers' perceptions and attitudes. In fact, as highlighted by Korzen & Lassen, 2009, context impacts consumers' perceptions of meat. Therefore, future research should include cross-cultural investigations providing a more accurate i) definition of HWGMs, ii) description of the supply chain of HWGM in the context of research, iii) insights into consumers' perceptions of hunting and their relationship with wildlife, and iv) insights into hunting knowledge.

5. Conclusions

The aim of this study was to review the current literature, synthesize and provide the reader critical insights about the state of the art regarding the variables and factors related to consumers' perceptions and attitudes toward HWGM in different developed socioeconomic contexts. Our study shows first that the interest around this issue is growing, as demonstrated by the rapidly increasing number of scientific publications devoted to this topic in recent years. Moreover, key variables and factors related to

consumer perceptions and attitudes toward HWGM are strictly connected to the geographical context for different reasons (i.e., available species, cultural differences, acceptance of hunting). Nevertheless, the literature analysis reveals that HWGM possess specific characteristics that make it interesting for modern consumers. However, the main barriers related to this product resulted in a lack of market availability and a low level of perceived food safety.

Appendix A. Overview of the papers selected for the review (n= 25)

Year	Authors	Title	Research methodology		Type	Sample			Species considered		Key findings(s)
			Type	Statistical analysis		Continent	Country	Size	Wild game species	Domesticated species	
2000	Burger, J.	Gender differences in meal patterns: Role of self-caught fish and wild game in meat and fish diets	Quantitative	Descriptive statistics and cross tabulation	Attendants to outdoor activities fair	North America	USA; South Carolina	457	Deer, rabbit, squirrel, raccoon, duck, dove, wild-caught quail, wild turkey	Beef, pork, chicken, wild caught fish, store-bought fish, restaurant fish, restaurant quail	Women were less likely to eat most types of wild game meat than men although there were no gender differences in the percentage eating beef, chicken, pork. Similarly, women consumed significantly fewer meals of wild game than did men.
2002	Burger, J. and Gochfeld, M.	Role of wild game in the diet of recreationists in South Carolina	Quantitative	Multiple regression analysis	Attendants to outdoor activities fair	North America	USA; South Carolina	454	Deer, rabbit, squirrel, raccoon, duck, dove, wild-caught quail, wild turkey	Beef, pork, chicken, wild-caught fish, restaurant fish, restaurant quail	In the black participants diet wild game represents up to 50% of the total meat consumed and 32% in the white participants diet. Game species seem generally eaten more by low-income black respondents, while more deer are consumed by higher-income black respondents.
2003	Hoffman, L.C.; Crafford, K.; Muller, N.; Schutte, D.W.	Perceptions and consumption of game meat by a group of tourists visiting South Africa	Quantitative	Descriptive statistics and cross tabulation	Tourists	Africa	South Africa	60	Duiker, gemsbok, impala, kudu, springbok, eland, wharthog, kangaroo, deer, european reedbeak, wild pig	Beef, pork, chicken, lamb, ostrich	Tourist visiting South Africa enjoy game meat, know the product and are aware of health benefits deriving from game meat consumption. The respondents further indicated game meat as the meat type they most favoured to order in restaurants in South Africa. The culling of game animals did not concern most of them.
2005	Hoffman, L.C.; Muller, M.; Schutte, D.W.; Caltz, F.J.; Crafford, K.	Consumer expectations, perceptions and purchasing of South African game meat	Quantitative	Descriptive statistics and cross tabulation	Heads of household	Africa	South Africa	300	Springbok, kudu, hare	Beef, pork, chicken, lamb, ostrich	Consumers do not purchase game meat regularly and consider it as an exotic, seasonal product. They have negative perceptions towards its price and poor availability. Furthermore, they are not willing to pay more for game meat than other types of meat. Fat content of meat is the most important attributes in meat purchase. Consumers were generally indecisive about hunting.
2006	Tolusic, Z.; Flonjancic, T.; Kralik, I.; Sesar, M.; Covic, M.	Game meat market in Eastern Croatia	Quantitative	Descriptive statistics and cross tabulation	Adult consumers	Europe	Croatia; Slavonia and Baranja	101	Roe deer, rabbit	None	Consumption of game meat is relatively low because of high price and safety motives. Consumers prefer meat of domestic animals, because it is cheaper, not paying attention to specific nutritive advantages of game meat. A significant number of examinees
2011	Bekker, J.B.; Hoffman, L.C.; Jooste, P.J.	Knowledge of stakeholders in the game meat industry and its effect on compliance with food safety standards	Quantitative and Qualitative	Descriptive statistics and cross tabulation	Stakeholders and students	Africa	South Africa	673	Referred by authors as "wildlife meat", "various species"	None	70% of the respondents prefer the game meat to be of local origin. Consumers have a high level of concern regarding the presence of health hazards in meat. Only few respondents related game meat to negative factors such as the meat being dark in colour, tough and originating from canned hunting; however the majority of the respondents perceive game meat of inferior quality compared to other types of meat. Findings revealed a general low level of knowledge of the stakeholders.
2011	Bodnar, K.; Bodname, Skobnik, E.; Tamas, L.; Pinney, S.Z.	Consumers' opinion about the hygienic risks of the meat of wild ungulates	Quantitative	Descriptive statistics and cross tabulation	Adult consumers	Europe	Hungary	250	Red deer, roe deer, fallow deer, mouflon, wild boar	None	Consumers are afraid of disease and hygienic risk related to game meat consumption. Differences were found between respondents living in cities and in the rural areas. Consumers who have a negative attitude to game meat are vegetarian or refuse consumption due to emotional reasons. Information given to consumers by producers about game meat safety need to be improved.
2014	Bodnar, K. and Szed, M.H.	Factors affecting game meat consumption among Hungarian University students	Quantitative	Descriptive statistics and cross tabulation	Expert students	Europe	Hungary	227	Red deer, roe deer, fallow deer, mouflon, wild boar, hare, pheasant, mallard duck	None	Most of the respondents ate game meat occasionally. The most frequently consumed game meat is the wild boar meat. The most popular species are wild boar, roe deer and pheasant. Respondents consider game meat expensive. Only few people reject game meat, and the main causes are: emotional reasons, never tasted it, vegetarian lifestyle, fear of zoonotic diseases.
2015	Ljung, P.E.; Riley, S.J.; Ericsson, G.	Game meat consumption feeds urban support of traditional use of natural resources	Quantitative	Path analysis	Adult consumers that had not hunted in the last 12 months	Europe	Sweden; Stockholm and Northern Sweden	5807	Moose, roe deer	None	Urban and rural residents' have different attitudes toward hunting. Path analyses suggest that experiences with hunting or hunters, and especially consumption of game meat, are associated with positive attitudes. Results suggest that finding ways to increase the distribution of game meat and associated social interactions to urban nonhunters will help maintain or increase support for hunting and enhance wildlife management.
2018	Demartini, E.; Vecchiato, D.; Tempesta, T.; Gaviglio, R.; Viganò, R.	Consumer preferences for red deer meat: a discrete choice analysis considering attitudes towards wild game meat and hunting	Quantitative	Cluster analysis; Discrete Choice Modelling	Adult consumers	Europe	Italy; Northern Italy	721	Red deer	Beef	On average, consumers show a good appreciation for red deer meat and are willing to pay 12% more for this type of meat than for beef ceteris paribus. Positive attitude towards wild game meat has an effect on the willingness to pay for red deer meat that is more than 3 times greater than being in favour of hunting. An analysis of the heterogeneity of consumer preferences has allowed to identify the presence of an important niche market for red deer meat served as carpaccio.
2018	Sevillano Morales, J.; Moreno-Ortega, A.; Amaro Lopez, M.A.; Arenas Casas, A.; Càmama-Martos, F.; Moreno-Rojas, R.	Game meat consumption by hunters and their relatives: a probabilistic approach	Quantitative	Risk analysis	Hunter and relatives	Europe	Spain; Andalusia	337	Red deer, wild boar, rabbit, red partridge	None	Hunters generally registered a larger intake of game meat. The total mean game meat consumption, per capita in the sample, is 6.87 kg/person/year of meat and 8.57 kg/person/year if the processed meat products (salami-type sausage) are also considered.
2018	Tomasevic, I.; Novakovic, S.; Solowoj, B.; Zdolec, N.; Skunca, D.; Krocun, M.; Nedonova, S.; Kolaj, R.; Aleksiev, G.; Djekic, I.	Consumers' perceptions, attitudes and perceived quality of game meat in ten European countries	Quantitative	Principal component analysis; Cluster analysis	Adult consumers consuming game meat	Europe	Albania, Bulgaria, Bosnia-Herzegovina, Czech Republic, Croatia, Macedonia, Montenegro, Serbia, Slovakia, Poland	3445	Deer, wild boar, rabbit, hare, pheasant, quail, partridge, other	None	Variables that affect mostly consumption of game meat are: geographical location, age and gender. In terms of perceived quality of game meat, consumers favor its health benefits and nutritional properties. Central European consumers, especially the younger generation, are more concerned with its price and sensory characteristics (in particular taste, overall quality, and odor).
2019	Marescotti, M.E.; Caputo, V.; Demartini, E.; Gaviglio, A.	Discovering market segments for hunted wild game meat	Quantitative	Principal component analysis; Cluster analysis; Probit model	Adult consumers	Europe	Italy	1029	Red deer, roe deer, wild boar, chamois	None	Three different segments have been identified: pro-animal consumers, disoriented consumers, and hunted wild game meat eaters. The three segments showed significant differences with respect to their socio-demographic characteristics (gender, education level and average household income), consumption of hunted wild game meat and their level of objective knowledge. A general lack of knowledge is reported among consumers.

2019	Wassenaar, A.; Kempen, E.; van Eeden, T.	Exploring South African consumers attitudes towards game meat. Utilizing a multi-attribute attitude model	Quantitative	Descriptive statistics and cross tabulation	Adult consumers and non-consumers	Africa	South Africa	1406	Gazelle, buffalo	None	Differences between game meat consumers and nonconsumers have been founded. Respondent groups differed most in their attitudes regarding the health benefits, sensory characteristics, availability, and ethics. Although nonconsumer respondents were relatively neutral regarding the importance of different attributes, food safety was rated as an important consideration, indicating that these respondents are particularly concerned about it.
2020	Hartmann, C. and Siegrist, M.	Our daily meat: Justification, moral evaluation and willingness to substitute	Quantitative	Principal component analysis; Logistic regression analysis; Two-step hierarchical regression analysis	Adult consumers	Europe	Germany	973	Deer, wild boar, duck	Beef, veal, pork, poultry, rabbit, lamb, cold cuts, sausages, exotic meat, fish, shellfish, meat substitutes	Hunted wild game meat is considered one of the most morally justifiable meat, similar to free-range chicken and organic beef. Meat-eating justification strategies correlated positively with meat consumption and negatively with willingness to substitute meat. Even though participants evaluated most of the conventional animal production systems to be morally not justifiable, they seemed not to behave accordingly with regard to meat consumption or willingness to substitute meat.
2020	Goguen, A.D. and Riley, S.J.	Consumption of Wild-Harvested Meat in Society	Quantitative	Logistic regression analysis; Linear regression	Adult consumers	North America	USA; Michigan	983	Deer, rabbit or hare, squirrel, raccoon, duck, quail, turkey, pheasant, bear, grouse, goose, elk, raccoon	None	Hunting experience, social network, and race have been identified as the only influential predictors of wild-harvested meat consumption. Hunting experience, social network, and level of urbanization of residence have been identified as the only influential predictors of frequency of venison consumption.
2020	Niewiadomska, K.; Kosicka-Gębska, M.; Gębski, J.; Gutkowska, K.; Jezewicz-Zychowicz, M.; Sulcik, M.	Game Meat Consumption - Conscious Choice or Just a Game?	Quantitative	Logistic regression analysis	Adult consumers consuming game meat	Europe	Poland	450	Deer, roe deer, fallow deer, wild boar, wild rabbit, wild birds	None	Rational motives have a greater impact on game meat choice than emotional reasons. The possibility of increasing the frequency of eating game is greater for the people who pay attention to the rational aspects related to the taste, low fat content, nutritional value and local origin of the meat.
2020	Krokowska-Patuszak, M.; Lukowski, A.; Wierzbicka, A.; Gruchala, A.; Sagan, J.; Skorupski, M.	Attitudes towards hunting in Polish society and the related impacts of hunting experience, socialisation and social networks	Quantitative	Principal component analysis; Descriptive statistics and cross tabulation;	Attendant to University Scientific event not hunting in the last year	Europe	Poland	486	Red deer, roe deer, wild boar	None	Respondents who included game meat in their diet on a regular basis had a more positive attitude towards hunting, as did respondents who participate in hunting. Having parents or friends who hunt were key positive influences on attitude towards hunting. Conversely, the inability to visit a forest due to ongoing hunting had a significant negative impact on attitude towards hunting.
2020	Marescotti, M.E.; Caputo, V.; Demartini, E.; Gaviglio, A.	Consumer preferences for wild game cured meat label: do attitudes towards animal welfare matter?	Quantitative	Principal Component Analysis; Cluster analysis; Discrete Choice Modelling	Adult consumers	Europe	Italy	168	Red deer	Bovine, horse	Preferences for the hunted wild game meat label were heterogeneous across the sample. Although the presence of the label "hunted wild game meat" does not provide any added value to consumers who are more concerned for animal rights and more price-conscious, more than half of the sample (56.6%) gain a significant level of utility from choosing red deer product carrying the hunted wild game meat label.
2021	Marescotti, M.E.; Demartini, E.; Gibbert, M.; Viganò, R.; Gaviglio, A.	Disentangling Individual Phases in the Hunted vs. Farmed Meat Supply Chain: Exploring Hunters' Perceptions in Italy	Quantitative	Descriptive statistics and cross tabulation	Hunters	Europe	Italy	104	Red deer, roe deer, wild boar, chamois	Pig	Hunters' preferences are oriented towards the consumption of hunted products, which are preferred over farmed products. Hunted wild boar meat is considered healthier, tastier and more ethical and environmentally friendly than conventional farmed meat. On the other hand, hunted wild game meat is perceived by hunters themselves as less safe to eat.
2021	Demartini, E.; Vecchiato, D.; Marescotti, M.E.; Gibbert, M.; Viganò, R.; Giacomelli, S.; Gaviglio, A.	The more you know the equivocal effects of prior knowledge on preferences for hunted vs. farmed wild boar meat	Quantitative	Discrete choice modelling; Scenario analysis	Adult consumers	Europe	Italy	510	Wild boar, red deer, roe deer, chamois	Beef, pork	Participant on average preferred farmed meat to hunted meat. Objective knowledge has a mixed effect on consumer preferences: the more consumers (objectively) know about hunting, the more they like hunted meat; in contrast, the more they know about farming, the less they like farmed meat.

References

- Arnett, E. B., & Southwick, R. (2015). Economic and social benefits of hunting in North America. *International Journal of Environmental Studies*, 72(5), 734–745. <https://doi.org/10.1080/00207233.2015.1033944>
- Bekker, J. L., Hoffman, L. C., & Jooste, P. J. (2011). Knowledge of stakeholders in the game meat industry and its effect on compliance with food safety standards. *International Journal of Environmental Health Research*, 21(5), 341-363. <https://doi.org/10.1080/09603123.2011.552715>.
- Boaitey, A., & Minegishi, K. (2020). Who are farm animal welfare conscious consumers? *British Food Journal*, 122(12), 3779–3796. <https://doi.org/10.1108/BFJ-08-2019-0634>
- Bodnar, Benak, A., & Bodnarne Skobrak, E. (2010). Analyses of consumer preferences and attitudes on Hungarian game meat market (preliminary report). *Lucr. Stiintifice*, 53, 9-12.
- Bodnar, Bodnarne Skobrak E., Tanacs, L., & Pinnyey, S. (2011). Consumers' opinion about the hygienic risks of the meat of wild ungulates.
- Bodnar, K., Hodi, M. S., & Bodnar, E. S. (2014). Acceptance of the meat of wild ungulates among the Hungarian consumers. *Agron. Ser. Sci. Res. Stiint. Ser. Agron*, 57, 35-38.
- Bodnar, K., & Szel, M. H. (2014). Factors affecting game meat consumption among Hungarian university students. *Lucrări Științifice Management Agricol*, 16(2), 76.
- Bureš, D., Bartoň, L., Kotrba, R., & Hakl, J. (2015). Quality attributes and composition of meat from red deer (*Cervus elaphus*), fallow deer (*Dama dama*) and Aberdeen Angus and Holstein cattle (*Bos taurus*). *Journal of the Science of Food and Agriculture*, 95(11), 2299-2306.
- Burger, J. (2000). Gender Differences in Meal Patterns: Role of Self-Caught Fish and Wild Game in Meat and Fish Diets. *Environmental Research*, 83(2), 140–149. <https://doi.org/10.1006/enrs.2000.4060>
- Burger, J., & Gochfeld, M. (2002). Role of Wild Game in the Diet of Recreationists in South Carolina. *Journal of Environmental Planning and Management*, 45(1), 103–128. <https://doi.org/10.1080/09640560120100213>
- Byrd, E., Lee, J., & Widmar, N. (2017). Perceptions of Hunting and Hunters by U.S. Respondents. *Animals*, 7(12), 83. <https://doi.org/10.3390/ani7110083>

- Carlsson, F., Frykblom, P., & Lagerkvist, C. J. (2007). Consumer willingness to pay for farm animal welfare: Mobile abattoirs versus transportation to slaughter. *European Review of Agricultural Economics*, 34(3), 321–344. <https://doi.org/10.1093/erae/jbm025>
- Coburn, H. L., Snary, E. L., Kelly, L. A., & Wooldridge, M. (2005). Qualitative risk assessment of the hazards and risks from wild game. *Veterinary Record*, 157(11), 321–322. <https://doi.org/10.1136/vr.157.11.321>
- Demartini, E., Vecchiato, D., Marescotti, M. E., Gibbert, M., Viganò, R., Giacomelli, S., & Gaviglio, A. (2021). The more you know: The equivocal effects of prior knowledge on preferences for hunted vs. farmed wild boar meat. *International Journal of Gastronomy and Food Science*, 24, 100325. <https://doi.org/10.1016/j.ijgfs.2021.100325>
- Demartini, E., Vecchiato, D., Tempesta, T., Gaviglio, A., & Viganò, R. (2018). Consumer preferences for red deer meat: A discrete choice analysis considering attitudes towards wild game meat and hunting. *Meat Science*, 146, 168–179. <https://doi.org/10.1016/j.meatsci.2018.07.031>
- Dickson, B., Hutton, J., & Adams, W. M. (A c. Di). (2009). *Recreational Hunting, Conservation and Rural Livelihoods*. Wiley-Blackwell. <https://doi.org/10.1002/9781444303179>
- FAOSTAT, 2020. Database <https://www.fao.org/faostat/en/#search/Meat%2C%20game>, accessed online 2021/10/25.
- Fagarazzi, C., Sergiacomi, C., Stefanini, F. M., & Marone, E. (2021). A Model for the Economic Evaluation of Cultural Ecosystem Services: The Recreational Hunting Function in the Agroforestry Territories of Tuscany (Italy). *Sustainability*, 13(20), 11229. <https://doi.org/10.3390/su132011229>
- Farouk, MustafaM., Strydom, P., Dean, R., Vather, N., Gcabo, M., & Amir, M. (2021). Industrial Halal hunted-game and feral animals' meat production. *Meat Science*, 181, 108602. <https://doi.org/10.1016/j.meatsci.2021.108602>
- Fiala, M., Marveggio, D., Viganò, R., Demartini, E., Nonini, L., & Gaviglio, A. (2020). LCA and wild animals: Results from wild deer culled in a northern Italy hunting district. *Journal of Cleaner Production*, 244, 118667. <https://doi.org/10.1016/j.jclepro.2019.118667>

- Gamborg, C., & Jensen, F. S. (2017). Attitudes towards recreational hunting: A quantitative survey of the general public in Denmark. *Journal of Outdoor Recreation and Tourism*, 17, 20–28. <https://doi.org/10.1016/j.jort.2016.12.002>
- Gaviglio, A., Demartini, E., & Marescotti, M. E. (2017). The creation of a local supply chain for large wild ungulates meat: Opportunities and limitation from an Italian alpine case study. *Calitatea*, 18(S2), 215-222., 9.
- Goguen, A. D., & Riley, S. J. (2020). Consumption of Wild-Harvested Meat in Society. *Wildlife Society Bulletin*, 44(3), 553–563. <https://doi.org/10.1002/wsb.1108>
- Gomes-Neves, E., Abrantes, A. C., Vieira-Pinto, M., & Müller, A. (2021). Wild Game Meat—A Microbiological Safety and Hygiene Challenge? *Current Clinical Microbiology Reports*, 8(2), 31–39. <https://doi.org/10.1007/s40588-021-00158-8>
- Hagen-Zanker, J., & Mallett, R. (2013). How to do a rigorous, evidence- focused literature review in international development. 27.
- Hampton, J. O., Hyndman, T. H., Allen, B. L., & Fischer, B. (2021). Animal Harms and Food Production: Informing Ethical Choices. *Animals*, 11(5), 1225. <https://doi.org/10.3390/ani11051225>
- Harguess, J. M., Crespo, N. C., & Hong, M. Y. (2020). Strategies to reduce meat consumption: A systematic literature review of experimental studies. *Appetite*, 144, 104478. <https://doi.org/10.1016/j.appet.2019.104478>
- Hartmann, C., & Siegrist, M. (2020). Our daily meat: Justification, moral evaluation and willingness to substitute. *Food Quality and Preference*, 80, 103799. <https://doi.org/10.1016/j.foodqual.2019.103799>
- Heberlein, T. A., Ericsson, G., & Wollscheid, K.-U. (2002). Correlates of hunting participation in Europe and North America. *Zeitschrift Für Jagdwissenschaft*, 48(S1), 320–326. <https://doi.org/10.1007/BF02192424>
- Hoffman, L. C., & Cawthorn, D. M. (2012). What is the role and contribution of meat from wildlife in providing high quality protein for consumption? *Animal Frontiers*, 2(4), 40–53. <https://doi.org/10.2527/af.2012-0061>
- Hoffman, L. C., Crafford, K., Muller, N., & Schutte, D. W. (2004). Perceptions and consumption of game meat by a group of tourists visiting South Africa, *South African Journal of Wildlife Research*, 33 (2) 2003: pp. 125-130. *South African Journal of Wildlife Research-24-month delayed open access*, 34(1), 103.

- Hoffman, L. C., Muller, M., Schutte, D. W., Calitz, F. J., & Crafford, K. (2005). Consumer expectations, perceptions and purchasing of South African game meat. *South African Journal of Wildlife Research-24-month delayed open access*, 35(1), 33-42.
- Hoffman, L. C., & Wiklund, E. (2006). Game and venison – meat for the modern consumer. *Meat Science*, 74(1), 197–208. <https://doi.org/10.1016/j.meatsci.2006.04.005>
- Dickson, B., Hutton, J., & Adams, W. A. (Eds.). (2009). *Recreational hunting, conservation and rural livelihoods: science and practice*. John Wiley & Sons.
- Krokowska-Paluszak, M., Łukowski, A., Wierzbicka, A., Gruchała, A., Sagan, J., & Skorupski, M. (2020). Attitudes towards hunting in Polish society and the related impacts of hunting experience, socialisation and social networks. *European Journal of Wildlife Research*, 66(5), 73. <https://doi.org/10.1007/s10344-020-01410-0>
- Kubberød, E., Ueland, Ø., Rødbotten, M., Westad, F., & Risvik, E. (2002). Gender specific preferences and attitudes towards meat. *Food Quality and Preference*, 13(5), 285–294. [https://doi.org/10.1016/S0950-3293\(02\)00041-1](https://doi.org/10.1016/S0950-3293(02)00041-1)
- Ljung, P. E. (2014). *Traditional use of wildlife in modern society* (Vol. 2014, No. 2014: 25).
- Ljung, P. E., Riley, S. J., & Ericsson, G. (2015). Game Meat Consumption Feeds Urban Support of Traditional Use of Natural Resources. *Society & Natural Resources*, 28(6), 657–669. <https://doi.org/10.1080/08941920.2014.933929>
- Ljung, P. E., Riley, S. J., Heberlein, T. A., & Ericsson, G. (2012). Eat prey and love: Game-meat consumption and attitudes toward hunting. *Wildlife Society Bulletin*, 36(4), 669–675. <https://doi.org/10.1002/wsb.208>
- Love, H. J., & Sulikowski, D. (2018). Of Meat and Men: Sex Differences in Implicit and Explicit Attitudes Toward Meat. *Frontiers in Psychology*, 9, 559. <https://doi.org/10.3389/fpsyg.2018.00559>
- Macdiarmid, J. I. (2014). Seasonality and dietary requirements: Will eating seasonal food contribute to health and environmental sustainability? *Proceedings of the Nutrition Society*, 73(3), 368–375. <https://doi.org/10.1017/S0029665113003753>
- Mallett, R., Hagen-Zanker, J., Slater, R., & Duvendack, M. (2012). The benefits and challenges of using systematic reviews in international development research. *Journal*

of *Development Effectiveness*, 4(3), 445–455.
<https://doi.org/10.1080/19439342.2012.711342>

Manfredo, M., Teel, T., & Bright, A. (2003). Why Are Public Values Toward Wildlife Changing? *Human Dimensions of Wildlife*, 8(4), 287–306.
<https://doi.org/10.1080/716100425>

Mankin, P. C., Warner, R. E., & Anderson, W. L. (1999). Wildlife and the Illinois public: a benchmark study of attitudes and perceptions. *Wildlife Society Bulletin*, 465–472.

Marescotti, M. E., Caputo, V., Demartini, E., & Gaviglio, A. (2019). Discovering market segments for hunted wild game meat. *Meat Science*, 149, 163–176.
<https://doi.org/10.1016/j.meatsci.2018.11.019>

Marescotti, M. E., Caputo, V., Demartini, E., & Gaviglio, A. (2020). Consumer preferences for wild game cured meat label: Do attitudes towards animal welfare matter? *International Food and Agribusiness Management Review*, 23(4), 599–618.
<https://doi.org/10.22434/IFAMR2019.0203>

Marescotti, M. E., Demartini, E., Gibbert, M., Viganò, R., & Gaviglio, A. (2021). Disentangling Individual Phases in the Hunted vs. Farmed Meat Supply Chain: Exploring Hunters' Perceptions in Italy. *Foods*, 10(1), 174.
<https://doi.org/10.3390/foods10010174>

Membré, J.-M., Laroche, M., & Magras, C. (2011). Assessment of levels of bacterial contamination of large wild game meat in Europe. *Food Microbiology*, 28(5), 1072–1079. <https://doi.org/10.1016/j.fm.2011.02.015>

Niewiadomska, K., Kosicka-Gębska, M., Gębski, J., Gutkowska, K., Jeżewska-Zychowicz, M., & Sułek, M. (2020). Game Meat Consumption—Conscious Choice or Just a Game? *Foods*, 9(10), 1357. <https://doi.org/10.3390/foods9101357>

Olson, M. (2014). *The Compassionate Hunter's Guidebook: Hunting from the Heart*. New Society Publisher.

Paulsen, P., & Winkelmayr, R. (2004). Seasonal variation in the microbial contamination of game carcasses in an Austrian hunting area. *European Journal of Wildlife Research*, 50(3), 157–159.

Peterson, M. N., Hansen, H. P., Peterson, M. J., & Peterson, T. R. (2011). How hunting strengthens social awareness of coupled human-natural systems. *Wildlife Biology in Practice*, 6(2), 144. <https://doi.org/10.2461/wbp.2010.6.10>

- Pieniak, Z., Aertsens, J., & Verbeke, W. (2010). Subjective and objective knowledge as determinants of organic vegetables consumption. *Food Quality and Preference*, *21*(6), 581–588. <https://doi.org/10.1016/j.foodqual.2010.03.004>
- Radder, L., & Grunert, K. G. (2009). Consumers' perceptions of African wildlife meat: A laddering study. *Journal of food products marketing*, *15*(2), 164-174.
- Ramanzin, M., Amici, A., Casoli, C., Esposito, L., Lupi, P., Marsico, G., Olivieri, O., Ponzetta, M., Russo, C., & Marinucci, M. (2010). Meat from wild ungulates: Ensuring quality and hygiene of an increasing resource. *Italian Journal of Animal Science*, *9*(3), e61., 14. <https://doi.org/10.4081/ijas.2010.e61>
- Ranucci, D., Roila, R., Onofri, A., Cambiotti, F., Primavilla, S., Miraglia, D., Andoni, E., Di Cerbo, A., & Branciarri, R. (2021). Improving Hunted Wild Boar Carcass Hygiene: Roles of Different Factors Involved in the Harvest Phase. *Foods*, *10*(7), 1548. <https://doi.org/10.3390/foods10071548>
- Resare Sahlin, K., Rööös, E., & Gordon, L. J. (2020). 'Less but better' meat is a sustainability message in need of clarity. *Nature Food*, *1*(9), 520–522. <https://doi.org/10.1038/s43016-020-00140-5>
- Rosenfeld, D. L., & Tomiyama, A. J. (2021). Gender differences in meat consumption and openness to vegetarianism. *Appetite*, *166*, 105475. <https://doi.org/10.1016/j.appet.2021.105475>
- Rothgerber, H. (2013). Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption. *Psychology of Men & Masculinity*, *14*(4), 363.
- Schulp, C. J. E., Thuiller, W., & Verburg, P. H. (2014). Wild food in Europe: A synthesis of knowledge and data of terrestrial wild food as an ecosystem service. *Ecological Economics*, *105*, 292–305. <https://doi.org/10.1016/j.ecolecon.2014.06.018>
- Sevillano Morales, J., Moreno-Ortega, A., Amaro Lopez, M. A., Arenas Casas, A., Cámara-Martos, F., & Moreno-Rojas, R. (2018). Game meat consumption by hunters and their relatives: A probabilistic approach. *Food Additives & Contaminants: Part A*, *35*(9), 1739–1748. <https://doi.org/10.1080/19440049.2018.1488183>
- Shaw, D. L. (1973). The hunting controversy: Attitudes and arguments.
- Cockram, M. S., Shaw, D. J., Milne, E., Bryce, R., McClean, C., & Daniels, M. J. (2011). Comparison of effects of different methods of culling red deer (*Cervus elaphus*) by shooting on behaviour and post mortem measurements of blood chemistry, muscle glycogen and carcass characteristics. *Animal Welfare*, *20*(2), 211-224.

- Spence, C. (2021). Explaining seasonal patterns of food consumption. *International journal of gastronomy and food science*, 24, 100332.
- Stedman, R. C., & Heberlein, T. A. (2009). Hunting and Rural Socialization: Contingent Effects of the Rural Setting on Hunting Participation. *Rural Sociology*, 66(4), 599–617. <https://doi.org/10.1111/j.1549-0831.2001.tb00086.x>
- Stoll-Kleemann, S., & Schmidt, U. J. (2017). Reducing meat consumption in developed and transition countries to counter climate change and biodiversity loss: a review of influence factors. *Regional Environmental Change*, 17(5), 1261-1277.
- Tolušić, Z., Florijančić, T., Kralik, I., Sesar, M., & Tolušić, M. (2006). Game meat market in Eastern Croatia. *Poljoprivreda*, 12(2), 58-63.
- Tomasevic, I., Novakovic, S., Solowiej, B., Zdolec, N., Skunca, D., Krocko, M., Nedomova, S., Kolaj, R., Aleksiev, G., & Djekic, I. (2018). Consumers' perceptions, attitudes and perceived quality of game meat in ten European countries. *Meat Science*, 142, 5–13. <https://doi.org/10.1016/j.meatsci.2018.03.016>
- Valencak, T. G., Gamsjäger, L., Ohrnberger, S., Culbert, N. J., & Ruf, T. (2015). Healthy n-6/n-3 fatty acid composition from five European game meat species remains after cooking. *BMC Research Notes*, 8(1), 273. <https://doi.org/10.1186/s13104-015-1254-1>
- Valente, A. M., Acevedo, P., Figueiredo, A. M., Martins, R., Fonseca, C., Torres, R. T., & Delibes-Mateos, M. (2020). Dear deer? Maybe for now. People's perception on red deer (*Cervus elaphus*) populations in Portugal. *Science of The Total Environment*, 748, 141400. <https://doi.org/10.1016/j.scitotenv.2020.141400>
- Vandello, J. A., Bosson, J. K., Cohen, D., Burnaford, R. M., & Weaver, J. R. (2008). Precarious manhood. *Journal of Personality and Social Psychology*, 95(6), 1325–1339. <https://doi.org/10.1037/a0012453>
- Viganò, R., Demartini, E., Riccardi, F., Corradini, A., Besozzi, M., Lanfranchi, P., Chiappini, P. L., Cottini, A., & Gaviglio, A. (2019). Quality parameters of hunted game meat: Sensory analysis and pH monitoring. *Italian Journal of Food Safety*, 8(1). <https://doi.org/10.4081/ijfs.2019.7724>
- Wassenaar, A., Kempen, E., & van Eeden, T. (2019). Exploring South African consumers' attitudes towards game meat—Utilizing a multi-attribute attitude model. *International Journal of Consumer Studies*, 43(5), 437–445. <https://doi.org/10.1111/ijcs.12523>

Westerterp-Plantenga, M. S. (1999). Effects of extreme environments on food intake in human subjects. *Proceedings of the Nutrition Society*, 58(4), 791–798. <https://doi.org/10.1017/S002966519900107X>

Zinn, H. C., Manfredo, M. J., & Barro, S. C. (2002). Patterns of Wildlife Value Orientations in Hunters' Families. *Human Dimensions of Wildlife*, 7(3), 147–162. <https://doi.org/10.1080/10871200260293324>

CHAPTER III

'I'm better than you': assessing the presence of Optimistic Bias among Italian wild ungulates hunters.

Annafrancesca Corradini¹, Eugenio Demartini¹, Roberto Viganò², Maria Elena Marescotti¹, Anna Gaviglio¹

¹Department of Veterinary Medicine and Animal Science (DIVAS), University of Milan, Italy, Via dell'Università, 6, 26900 Lodi, LO, Italy

²Studio Associato AlpVet, Piazza Venzaghi, 2, 21052 Busto Arsizio, VA, Italy

Abstract

According to latest scientific evidence, Hunted Wild Game Meat (HWGM) is appreciated by the public for its positive characteristics, but its consumption may expose consumers to some risks. HWGM is produced by hunters which may find hardly to identify themselves as food producers since hunting in Western countries is practiced as a leisure activity. Therefore, hunter may underestimate the risk linked to their actions related to HWGM preparation, failing in preserve HWGM safety during the production process. To test this hypothesis, the present study aims to explore the presence of Optimistic Bias (OB) on a sample of Italian hunters. To detect the presence of OB, a sample of 408 hunters was asked to indicate their *own* risk and the perceived risk of their *peers* of causing a foodborne disease to the final consumer, in relation to the practices implemented during the phases of HWGM handling and preparation. Also, information about the destination of HWGM and hunters' knowledge of basic principles of food safety, risk perception of HWGM preparation were collected. Our results show that hunters generally tend to perceive themselves 'better than their peers' in performing actions to preserve HWGM safety, especially if

the peers were unfamiliar to the respondent. Furthermore, OB correlates knowledge of basic principles of food safety and to risk perception of HWGM preparation related practices. Finally, hunters defined themselves as ‘nature lover’ and ‘enthusiasts’ and did not recognize their role as ‘food producers’. Thus, our findings emphasize the importance of improving hunters’ training to preserve public health, addressing the need of more targeted strategies able to enhance hunters’ awareness of their role as food producers.

1. Introduction

A strain of recent literature reports that segments of European consumers appreciate hunted wild game meat (HWGM) (Corradini et al., 2022). Motivations may be found in the fact that HWGM has an optimal nutritional profile and consumers perceive it as a healthy meat that derives directly from animals that live wild in nature (Demartini et al., 2018; Marescotti et al., 2019, 2020), which contributes to the perception of more natural, more animal welfare respectful and more sustainable meat when compared to farmed options such as pork and beef (Tolušić et al., 2006; Tomasevic et al., 2018; Fiala et al., 2020; Hartmann & Siegrist, 2020; Marescotti et al., 2021; Demartini et al., 2021).

Meanwhile, however, research that focuses on HWGM safety highlights the downside of the coin: HWGM consumption may expose consumers to different hazards deriving primarily from toxic metals contamination (Thomas et al., 2020; Nkosi et al., 2021) and/or microbiological agents causing foodborne infections (Di Cola et al., 2021; Gomes-Neves et al., 2021; Guardone et al., 2022). As pointed out by several authors, HWGM hygiene level highly depends on post-hunting practices implemented by hunters (i.e., Gill, 2007; Almería et al., 2021; Paulsen et al., 2012; Gomes-Neves et al., 2021). The role of hunters is therefore crucial throughout the different phases of the production process. In fact, regardless HWGM is commercialized or self-consumed, the first stages of its production are always in their hands (Ranucci et al., 2021) since soon after the harvest of the game, they perform cutting, bleeding, and evisceration on the field (Gill, 2007). Nevertheless, it must be emphasized that hunters are not professional food handlers. European hunters are mostly portrayed as enthusiastic hobbyists who practice this activity for recreational purposes (Gamborg & Jensen, 2017), thus the hypothesis that they may find hard to recognize themselves as *fully-fledged food producers* seems reasonable. Nonetheless, hunters' awareness and knowledge of the risks connected to HWGM bad handling and mechanisms of foodborne diseases exposure acquired during training play a crucial role in protecting consumers (Hedman et al., 2020; Paulsen, P.; Bauer, A.;

Vodnansky, M.; Winkelmayr, R.; Smulders, F.J.M.; Paulsen, P.; Bauer, A., 2011; Paulsen & Winkelmayr, 2004).

A lack of hunting and post-harvesting food safety practices, such as gut rupture due to incorrect shooting (Gill, 2007; Branciarri et al., 2020), late removal of the intestines (Avagnina et al., 2012) and late bleeding (Viganò et al., 2019), decrease the quality of the meat and increase the risk of proliferation of bacterial pathogens in HWGM that can be harmful for hunters and final consumers (Deutz et al., 2000). Enteric pathogens such as *Salmonella* spp., *Yersinia enterocolitica*, *Campylobacter* spp. and *E. coli* can contaminate the carcasses during the evisceration process (Peruzy et al., 2022; Avagnina et al., 2012; Sales & Kotrba, 2013; Fredriksson-Ahomaa, 2019; Ranucci et al., 2021) Insufficient or delayed carcass cooling may negatively affect meat hygienic quality since a proper cooling of the carcass minimize microbial growth (Paulsen & Winkelmayr, 2004; Hedman et al., 2020; Ranucci et al., 2021). *Thus, what may happen if hunters underestimate the importance of these practices?*

As mandated by Regulation (EC) No 853/2004, European hunters are not required to be trained on food safety issues that assure that they are aware of the potential risks connected to their actions when handling their games, unless in case of commercialization. Thus, according to the same Regulation, non- officially inspected HWGM could both be supplied directly from hunters to the final consumer or “*to local retail establishment supplying the final consumer*” (e.g., local restaurants, butchers, small groceries stores) or consumed at home by hunters and their families and friends (Gaviglio et al., 2018; Schulp et al., 2014). However, due to a lack of data about the destination of HWGM and according to the options provided for by European legislation, it is not possible to know with any degree of accuracy how exactly HWGM reaches the consumer. Nevertheless, is essential to highlight that an inaccurate implementation of practices intended to guarantee HWGM safety may jeopardize consumers’ health, threatening especially vulnerable groups, such as the elderly, immunocompromised individuals, pregnant women, and infants that are at

increased risk of morbidity and mortality from foodborne infections (Lund & O'Brien, 2011; Hedman et al., 2020).

Literature suggests that human behaviour plays a crucial role in food safety outcomes (Jespersen & Huffman, 2014; Evans et al., 2021). Hence, people involved in product processing must be trained to be adequately aware about the possible contaminations due to improper food handling, nonetheless, even trained food handlers may fail in the implementation of correct practices (da Cunha et al., 2014, 2015; Rossi et al., 2017). Among the possible explanations of this unwanted outcome, some authors tested the role of the optimistic bias (OB) in food handlers. The OB, also called '*unrealistic optimism*', is a cognitive bias defined as "*a positive outlook regarding future events, in which individuals find themselves less likely than others to experience negative events*" (Weinstein, 1984; Gouveia and Clarke, 2001). In other words, individuals do not make the same estimate of risk when comparing risks to them and people in general, considering themselves at lower risk than others. As suggested by (da Cunha et al., 2014), the presence of OB in food handlers might lead to an increase in the risk of food-borne diseases among consumers, due to negligence in implementing food safety-related practices. Thus, *biased* hunters could overlook some protection attitudes and, not only, unintentionally contaminate HWGM but also *mishandle* the product during the entire HWGM production process. Previous studies assessed the existence of OB in food handlers, observing its possible correlation with other factors such as risk perception, knowledge and level of training in food handling practices. These studies focused on food services (Rossi et al., 2017), street food kiosks, restaurants, and hospitals and school catering services (da Cunha et al., 2014, 2015), however, previous research never focused on the presence of optimistic bias among hunters.

The present contribution aims to fill this gap by testing if hunters underestimate the risk related to bad handling practices of HWGM when comparing themselves to a peer. Our research contributes to the literature exploring the presence of OB and discussing its possible implication for HWGM food safety management. Such a

glimpse can be useful in design public interventions aimed at protecting hunters' and consumer health, also with a future perspective of creating a *safe* Italian HWGM supply chain. Moreover, the present research wants to collect information about the Italian hunters' knowledge and perception of risk connected to the implementation of HWGM safety-related practices, possible correlations of these variable with OB will be also explored. The paper is organised as follows: Section 2 will present the Methods, followed by Section 3 in which the Results will be discussed; finally, in Section 4 the conclusions will be drawn.

2. Method

2.1. Data collection and survey instrument

Data have been collected with an online survey distributed from July to August 2022 to a sample of Italian hunters of large wild ungulates (*Cervus elaphus*, *Capreolus capreolus*, *Rupicapra rupicapra rupicapra*, *Ovis musimon*, *Dama dama* and *Sus scrofa*). To reach the participants, a first contact list has been provided by veterinary experts that hold training courses, workshops, and seminars specifically addressed to hunters. Then, with a snowballing process, hunters themselves have spread the survey through social media (such as WhatsApp, Facebook). Before launching the survey, a preliminary pilot test with 50 subjects has been done to check the survey flow and the questions clarity. After the soft launch, only minor modifications have been made to improve the quality of the questionnaire. Finally, 1,271 subjects took the questionnaire and 408 hunters completed it.

The survey started with an informed consent sheet for data collection and analysis, followed by a brief text explaining the focus of the interview. The survey tool was composed by four sections. The questions of the first section were related to sociodemographic characteristics of the hunters, hunters training level and the destination of the HWGM obtained during the hunting season. To detect hunters training level, the participants were asked if they are or not '*trained hunters*' as

defined by Reg. (EC) No 853/2004 and completed the course on appropriate handling practices of HWGM carcasses stating that allow them to commercialize their games.

The second section aimed at detecting the presence of OB and risk perception of HWGM food safety-related practices. As described in Table 1, the estimation of OB was based on five items adapting (da Cunha et al., 2014; Rossi et al., 2017) related to the probability of suffering a foodborne disease caused by consuming HWGM handled or cooked by themselves (Q2 and Q5) or the following peers: (1) their hunting partner(Q4); (2) an unfamiliar hunter with the same age and training of the respondents (Q1); or (3) an unfamiliar hunter with a different training of the respondents (Q3). Furthermore, as described in Table 2, the analysis of hunters' risk perception of HWGM preparation related practices was assessed using four items adapted by the *Risk perception of foodborne diseases questionnaire* proposed by (Rossi et al., 2017). Items have been formulated considering different critical points related to HWGM management that play a prominent role in HWGM safety such as evisceration and bleeding, cooling and transportation of the carcass, sanitization of kitchen tools and meat thawing.

In both cases, to measure hunters' perceptions participants were asked to express their agreement using a 7-points interval scale ranging from “*strongly disagree*” to “*strongly agree*”.

Table 1. The optimistic bias questionnaire

Please indicate how likely do you think is that a consumer will suffer a foodborne disease (stomach-ache and/or vomiting) caused by consuming meat from large ungulates with the following characteristics:

Q1 – Unfamiliar hunter with same characteristics	The prey was hunted and the HWGM was cooked by another hunter, who is the same age as you and possesses your same level training
Q2 – Interviewed hunter	You hunted the prey and cooked the HWGM
Q3 – Unfamiliar hunter with different characteristics	The prey was hunted and HWGM was cooked by a hunter who does not possess your same level of training
Q4 – Hunting partner of the respondent performing improper behaviours	Your hunting mate hunted and cooked HWGM, but your hunting mate did not wash his/her hands before cooking
Q5 – Interviewed hunter performing improper behaviors	You hunted and cooked the HWGM, but you did not wash your hands before cooking
Translation from Italian	

Table 2. Hunters’ risk perception of HWGM preparation related practices

Please indicate how likely you think it is that a consumer will suffer a foodborne disease (stomach-ache and/or vomiting) caused by consuming meat from large ungulates hunted and cooked by you, under the following conditions:

R1 - Field operation (evisceration and bleeding)	You fail to eviscerate and bleed the carcass properly
R2 – Transportation	You fail to cool the carcass in a short time and the transportation to the refrigerated cell is not immediate
R3 - Kitchen behavior	You do not properly sanitize a tool used for HWGM processing
R4 - Kitchen behavior	You prepare HWGM that has been improperly thawed
Translation from Italian	

The third section was related to hunters’ knowledge of and self-reported practices. To evaluate hunters’ knowledge about fundamentals of HWGM safety and proper handling practices, six multiple-choice questions with 3 response options was developed with experts in the field and a knowledge score was calculated as the

number of correct answers provided by each respondent. Then, relying on what has been done by (Paulsen & Winkelmayr, 2004; Gaviglio et al., 2017) respondents were asked about their practices during and after the culling of their games using a set of questions including for example “Do you bleed the game just after shooting?” or “How do you mature the game?” or “Where does the game mature?”. Finally, at the end of the questionnaire participants were asked to define their role as hunters. Participants were asked to express their agreement to 6 statements on a 7-points interval scale ranging from “strongly disagree” to “strongly agree”.

2.2. Analytical approach

Using SPSS®, to assesses the presence of the OB a set of paired *t*-test were performed between the perception of risk due to personal behaviours (Q2) and the perception of risk due to behaviours of different peers (Q1, Q3 and Q4), and between the perception of risk due to personal improper behaviours (Q2) and the perception of risk due to improper behaviours of the hunting partner (Q5). Furthermore, to explore the relationship among the OB and hunters’ knowledge of about fundamentals of HWGM safety and risk perception of HWGM food safety related practices a two-step procedure was applied. Firstly, the individual optimistic bias was calculated for all the statistically significant comparison calculated with the paired *t*-test (e.g., Q1-Q2 was calculated per each responding hunter if the *t*-test resulted significant). Then the Pearson correlation between each significant OB and knowledge score and the risk perception item was calculated.

3. Results

3.1. Sociodemographic characteristics of the sample

Table 3 reports a synthesis of the socio-demographics characteristics of the respondents. On 408 respondents, the most representative age group was the one between 55-65 years (26.47%), the majority of which are male (97.06%). The level of education was high, with 51.72% of the hunter population surveyed having completed high school. The distribution of areas of residence was homogeneous

among respondents with a slight majority of residents in peri-urban areas (42.16%) and most of the sample was from the North-Western Italy (71.08%). Unfortunately, no recent statistics on the demographic characteristics of the Italian hunters are available that allowed a comparison of the sample with the entire Italian hunter population. However, data referred to the end of the 90s shows that the most represented group was men (99.40%) aged between 30 and 49 years (60.00%). Moreover, according to the latest data from the Italian National Institute of Statistics, the hunters' population is getting older (Coldiretti, 2011; Istat, 2015, 2016).

Table 3: Socio-demographic characteristics of the sample

Variables	<i>n.</i>	%
Age		
18-25 years	15	3.67
26-35 years	47	11.52
36-45 years	68	16.67
46-55 years	98	24.02
56-65 years	108	26.47
66-70 years	72	17.64

Gender		
Male	396	97.06
Female	12	2.94
Education		
First and secondary school	91	22.3
High school	211	51.72
Degree	73	17.9
Higher education	33	8.09
Residence Area		
Rural	129	31.62
Periurban	172	42.16
Urban	107	26.23
Geographical region of residence		
Northeast Italy	88	21.57
Northwest Italy	290	71.08
Central Italy	23	5.64
Southern Italy and Islands	7	1.72
<i>Number of subjects= 408</i>		

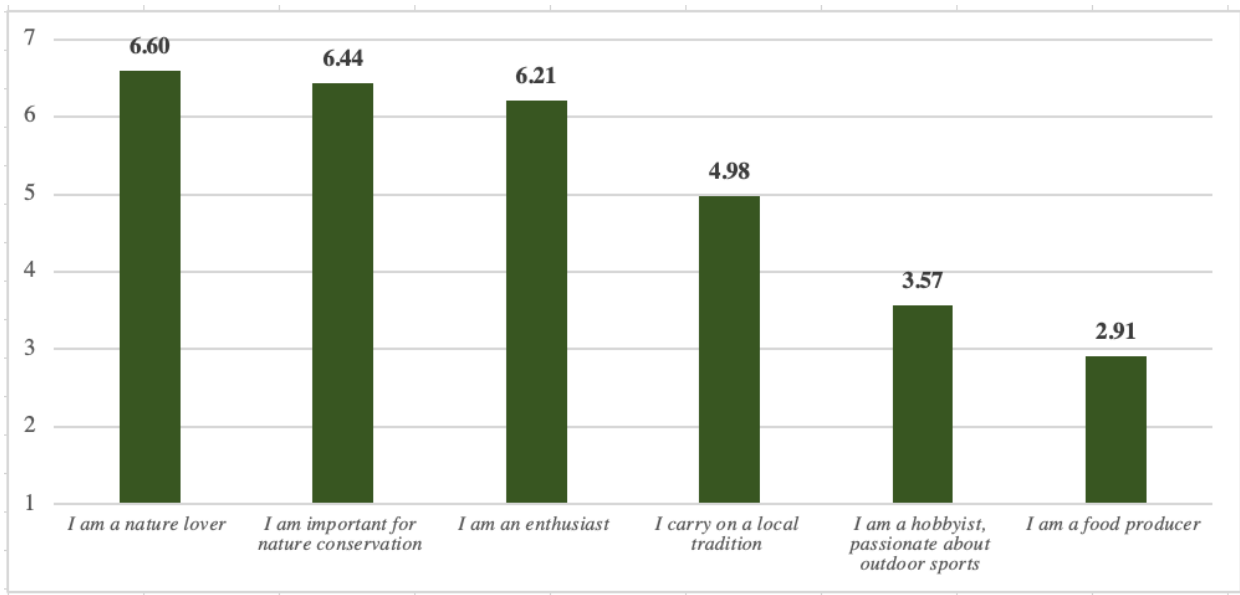
3.2 HWGM destination, self-reported practices, and hunters' self-definition

With regards to the destination of the HWGM, the interviewed hunters answered that the 65.30% of the meat consumed at home, the 29.24 % is given as a gift to friends and relatives, and the remaining 3.24 % and 2.23% is supplied directly to consumers' or small local businesses or commercialized respectively.

Moreover, 97.10% of hunters declared that they personally take care about HWGM evisceration, in most cases immediately after the shot (90.70%). Hunters stated that the evisceration takes place immediately after (59.07%) or within an hour after the shoot (38.48%), whereas only a small percentage of hunters (2.45%) declared that this practice is performed more than one hour after the shoot. Next, most hunters (76.70%) declared that they personally take care of stages of carcass processing (i.e., skinning, slaughtering, and portioning).

Finally, to understand how aware the interviewed hunters were of their role as food producers, some questions were aimed to explore how hunters perceive themselves. The results are presented in Figure 1 and show that the best self-descriptions for hunters were '*nature lover*' (Mean= 6.60; SD= 1.04), '*someone that has a role in nature conservation*' (Mean= 6.44; SD= 1.13), or – generally - '*an enthusiast*' (Mean= 6.21; SD= 1.49). On the other hand, the hunters were less inclined to describe themselves as '*someone that carry on a local tradition*' (Mean= 4.98; SD= 1.97) or '*hobbyist, passionate about outdoor sports*' (Mean= 3.57; SD= 2.27). In the end, the item '*I recognize myself as a food producer*' was the less representative for Italian hunters (Mean= 2.91; SD= 2.15).

Figure 1. Italian hunters' self-definition



(1= "Strongly disagree"; 7="Strongly agree")

3.3 Risk perception of HWGM preparation

The results on hunters' perception of risk related to bad handling practices of HWGM are presented in Table 4. No relevant differences were found between the items, since values resulted to be comprised from R1 (Mean= 3.44; SD= 1.99) and R4 (Mean= 3.86; SD= 2.05) This means that the steps involved in the processing are perceived as – at least - similarly risky for the HWGM safety outcome. Among the practices considered, the two that are perceived by hunters as riskier are those involving carcass cooling (Mean= 3.60; SD=1.84) or HWGM thawing (Mean= 3.86; SD= 2.05).

Table 4. Hunters' risk perception of HWGM preparation related practices

Item	Mean	SD
R1 - You fail to eviscerate and bleed the carcass properly	3.44	1.99
R2 - You fail to cool the carcass in a short time and the transportation to the refrigerated cell is not immediate	3.60	1.84
R3 - You do not properly sanitize a tool used for HWGM processing	3.46	1.89
R4 - You prepare HWGM that has been improperly thawed	3.86	2.05

(1= "Not likely at all"; 7="Absolutely likely)

3.4 Hunters' training and knowledge of basic principles for HWGM safety

Table 5 reports the results related to hunters' knowledge of basic principles for HWGM safety. In this regard, it is worth being emphasized that two questions – K1, K4 and K6 – were answered correctly by a very high percentage of respondents, while the rest of the test was answered correctly by less than half of the respondents. This evidence seems somewhat negative since a high percentage of participants (81.86%) among the interviewed declared they have the title of “*trained hunters*”, which means that they had followed a training course on HWGM handling (as required by EU law 853/04). Of these, 11.98 % stated that they followed the training course in the current year (2022), 8.98 % followed the course 1-2 years ago, 32.93 % 3-4 years ago, and most (46.11%) of the trained hunters obtained the title more than 5 years ago.

Table 5. Hunters' knowledge of basic principles for HWGM safety

Question	Correct answer (%)
K1 - The meat maturation must take place at temperatures between 0 and 4 °C	80.39
K2 - The typical 'dark' colour of game meat can result from high myoglobin content and higher pH values	48.53
K3 - A correct meat maturation needs the game to have sufficient glycogen reserves	26.72
K4 - The biological hazards linked to game meat consumption are pathogens such as <i>Salmonella spp.</i> , <i>Campylobacter spp.</i> , <i>Escherichia Coli O:157</i> and Hepatitis E	89.46
K5 - Food-borne diseases can be transmitted to humans during consumption of any food, whether raw or cooked	33.82
K6 - <i>Trichinella britovi</i> is typically found in the muscles of wild boar	65.44

3.5 Italian hunters' Optimistic Bias

The results shown in Table 6 reveal that the optimistic bias occurred in all the cases considered in the present research (all $ps \leq 0.001$). The analysis indicates that hunters rated the probability that their behavior imply specific risks related HWGM consumption lower than that of their peers. In other words, hunters rated the chance that a consumer might be at risk of food poisoning lower if they perform firsthand the HWGM handling and preparation; they then rated this probability of risk higher when asked about their peers. Specifically, the OB was found comparing the responding hunters' evaluations of him(her)self with an unfamiliar hunter with the same characteristics (Mean OB= -0.451; SD= 1.575; Cohen's $d = -0.286$), an unfamiliar hunter with a different training (Mean OB= -1.772; SD= 2.193; Cohen's $d = -0.808$), and his(her) hunting partner in typical conditions (Mean OB= -0.210; SD= -1.298; Cohen's $d = 0.162$) or when (s)he did not wash his(her) hands before cooking (Mean OB= -0.900; SD= 2.102; Cohen's $d = -0.428$). Interestingly, risk perception varies when linked to hunter familiarity with the peer, meaning that the greater the distance with the peer (unfamiliar), the higher the value of OB.

Table 6. Optimistic bias among Italian hunters

Optimistic bias	Personal risk		Peer risk		Personal - Peer risk		Paired t test		Cohen's d
	Mean	SD	Mean	SD	Mean	SD	t	p	
Q2 - Interviewed hunter vs Q1 - Unfamiliar hunter with same characteristics	1.770	1.510	2.220	1.460	-0.451	1.575	-5.785	0.000	-0.286
Q2 - Interviewed hunter vs Q3 - Unfamiliar hunter with different characteristics	1.770	1.520	3.540	1.890	-1.772	2.193	-16.320	0.000	-0.808
Q2 - Interviewed hunter vs Q4 - Hunting partner of the respondent preforming improper behaviours	1.770	1.530	2.670	1.680	-0.900	2.102	-8.642	0.000	-0.428
Q5 - Interviewed hunter performing improper behaviours vs Q4 - Hunting partner of the respondent	2.460	1.680	2.670	1.680	-0.210	-1.298	3.280	0.001	0.162

To further explore the nature of OB among the interviewed hunters, the Table 7 shows the correlations between risk perceptions of HWGM preparation related practices, knowledge of basic principles for HWGM safety and the optimistic bias. The optimistic bias items were found negatively correlated with knowledge, namely Q2 vs Q3 ($Corr. = -0.113$; $p = 0.022$) and Q2 vs Q4 ($Corr. = -0.134$; $p = 0.007$) indicating that the more hunters know about HWGM safety, the less are prone to think they are better than other unknown hunters with different characteristics and their hunting partners. Interestingly, the same pattern was found in the correlations between OB and the items measuring hunters risk perception of HWGM preparation related practices; all the correlation were in fact negative and significant (all $ps < 0.000$). Negative and significant correlations were also found between the optimistic bias relate to self-evaluation compared to the hunting partner with three out four risk perception items ($0.003 < ps < 0.022$). However, it is worth emphasizing that the correlations were strongest when interviewed hunters compare themselves to unfamiliar hunters with different characteristics and when interviewed hunters

compare themselves to one of their hunting partners, for all preparation related practices. This suggests that the knowledge might play a role in mitigating the optimistic bias especially when the optimistic bias is higher.

Table 7. Correlations among OB and hunters' knowledge of basic principles for HWGM safety and risk perception of HWGM preparation related practices

		Knowledge	R1 - Field operation (evisceration and bleeding)	R2 - Transportation	R3 - Kitchen behavior	R4 - Kitchen behavior
Q2 - Interviewed hunter vs Q1 - Unfamiliar hunter with same characteristics	<i>Corr.</i>	-0,095	-0.118*	-0.145**	-0.053	-0.113*
	<i>p</i>	0,056	0.017	0.003	0.288	0.022
Q2 - Interviewed hunter vs Q3 - Unfamiliar hunter with different characteristics	<i>Corr.</i>	-,113*	-0.320**	-0.349**	-0.272**	-0.354**
	<i>p</i>	0,022	0.000	0.000	0.000	0.000
Q2 - Interviewed hunter vs Q4 - Hunting partner of the respondent	<i>Corr.</i>	-,134**	-0.328**	-0.353**	-0.248**	-0.268**
	<i>p</i>	0,007	0.000	0.000	0.000	0.000
Q5 - Interviewed hunter performing improper behaviours vs Q4 - Hunting partner of the respondent	<i>Corr.</i>	0,032	0.063	0.133**	-0.086	-0.076
	<i>p</i>	0,517	0.208	0.007	0.084	0.127

Significance levels: ***p < .001; **p < .010; *p < .050

4. Discussion

The present study aimed at identifying the presence of OB among Italian hunters and collecting data about HWGM destination and hunting practices, and hunters' self-definition and level of training, and hunters' knowledge of basic principles for HWGM safety. Moreover, our study explored the correlations between OB and hunters risk perception of HWGM preparation related practices.

First, our findings suggest that most of the hunters use HWGM for domestic consumption confirming what has been previously claimed by (Marescotti et al., 2021): the Italian hunting sector seems to continue be a '*private affair*' since the commercialization of this resource is still, although fostered by different stakeholders, not yet implemented, and sustained by an organized supply chain

(Gaviglio et al., 2017, 2018). Next, considering self-reported practices, findings appear to be slightly encouraging since most of hunters surveyed declared to implement what literature indicates to be the best practices for HWGM handling. Immediate bleeding and proper evisceration of the prey are two essential procedures to preserve HWGM hygiene and quality (Paulsen & Winkelmayr, 2004; Hoffman & Wiklund, 2006; Gill, 2007; Avagnina et al., 2012; Viganò et al., 2019; Branciarri et al., 2020). In particular, it is interesting to highlight that higher contamination levels have been found in carcasses eviscerated 3 hours after the shoot (Avagnina et al., 2012; Peruzzy et al., 2022) and hunters surveyed in our sample declared to perform this action immediately after the shot. Regarding self-definition, our findings confirm what previously suggested by Gaviglio et al. (2017, 2018) and Marescotti et al. (2021), that emphasized that despite hunting activity providing HWGM, Italian hunters seem to refuse to consider themselves as potential primary actors involved in a food supply chain, while they see themselves as ‘nature lovers’ and ‘important for nature conservation’.

Our results revealed the presence of OB among Italian hunters. Previous studies focused on detecting the presence of OB in food handlers reported similar results and showed that higher OB are normally estimated when individuals compare themselves with unfamiliar than familiar peers (da Cunha et al., 2014, 2015; Rossi et al., 2017; de Andrade et al., 2019, 2020), confirming that the variation of OB is linked to the psychological closeness with the target (Perloff & Fetzer, 1986; Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995; Harris & Middleton, 1994; Helweg-Larsen & Shepperd, 2001). This means that people such as a close friend or family member, or in this case, a hunting mate can be judged differently than an unknown peer, since, for example, the respondents might have more prior information about peers’ behaviour (Helweg-Larsen & Shepperd, 2001). Furthermore, OB can occur when people have little personal experience with a hazard or when a negative outcome is commonly judged of low probability, thus minimizable or avoidable with the implementation of a specific precaution (Weinstein, 1989). Generally, individuals

tend to formulate risk judgments that do not threaten self-esteem, since self-judging less at risk than others may be directed toward the preservation of one's self-esteem and personal skills (Miles & Scaife, 2003). In fact, as emphasised by Miles & Scaife, 2003, especially when a threat is controllable or in some way preventable, asserting that other individuals are less or equally exposed to potential danger than oneself may threaten one's perception of competence and self-esteem. In this sense, an overconfident individual about her(his) skills (Dunning, Heath, & Suls, 2004) has been proven to affect the OB displaying. This could also be a key to understanding why OB also emerges when a hunter compares himself with an '*identical*' peer (Q2 vs Q1) (defined in our study as a hunter of the same age and having the same level of training).

Moreover, seems worth to emphasize that hunters judged themselves as less likely to incur in a negative outcome even if they performed the same risky behaviour of their hunting partners (not washing their hands before preparing HWGM). According to (da Cunha et al., 2014; Rossi et al., 2017), who observed the same phenomenon in food handlers, this biased evaluation might stem from egocentric thinking (Shepperd et al., 2013). Egocentrism may be due to many causes, such as the individual tendency to focus on self rather than on others, have different or more information about themselves when making judgements compared to others (Shepperd et al., 2013). Next, a comparison with the findings of (Siegrist & Árvai, 2020) in their recent review on risk perception can be proposed. Laypeople and professionals should possess different level of risk perception, since experts possess a domain-specific knowledge that allow them to be aware of domain-specific hazard. Besides other individual factors that have been related to risk perception (e.g., levels of scientific reasoning ability and reasoning style) authors prompt the role of specific-domain knowledge to be prominent since the more people are informed about a particular hazard, the more their perceptions of risk tend to be highly correlated with domain-specific knowledge. Considering this, the present study results may be alarming, since hunters, although not professionals as food handlers, are supposed to

possess high(er) knowledge on HWGM related risk. In this sense, results here presented may suggest that it is necessary to increase the level of knowledge among Italian hunters. This would help make them more informed and aware of the risk they face and to which they expose consumers, considering that hunters are HWGM first consumers.

5. Conclusion

Taking a cue from the literature that has recently detected the presence of OB in food handlers, this study aimed at assessing the presence of OB in Italian hunters. The peculiarity of the study relates to the population on which this bias was identified. Results show that hunters defined themselves mostly as *nature enthusiasts* showing difficulties in recognising their role as primary meat producers who could potentially sell the HWGM on the market as allowed by the European and the National regulation. This may suggest that hunters may not possess a complete awareness of their role which include *also* to be producers, especially in view of a future implementation of an Italian supply chain for HWGM commercialization may result an issue for public health (Gaviglio et al., 2018; Demartini et al., 2021; Orsoni et al., 2020).

Hunters have been found to be the primary consumers of HWGM, since they declared they use this resource mainly for home consumption. Moreover, the hunters involved in the study declared that self-reported practices related to carcass handling appear to be in line with those recommended for maintaining HWGM food safety. However, the presence of OB was detected. This means that hunters judge themselves better than their peers, when asked about assessing the risk of causing a foodborne disease to the final consumer of HWGM. The role of OB has been studied in many research domains in the last four decades (Shepperd et al., 2017) and only in recent years, OB is gaining attention in Food safety culture studies (Zanin et al., 2021). Food handlers, and thus in our case hunters, with low-risk perception may have difficulties to understanding and apply the concepts and practices at the

foundation of the food safety. Italian hunters' population has been proven to fail in distinguish among different risks triggered by different hazard. In line with what has already argued by several authors, there is an urgent need to design better strategies to train and inform Italian hunters' population (Avagnina et al., 2012; Ranucci et al., 2019, 2021; Branciarri et al., 2020; Orsoni et al., 2020; Guardone et al., 2022; Peruzzy et al., 2022). Implementing communication and hunters' knowledge by designing tailored training strategies is therefore recommended, to encourage changes in hunters' behaviour and foster good practices to reduce the presence of OB. Finally, the present work focused on hunters as the main figure, but a fundamental previous stage related to hunters training, namely the 'training of trainers', has not been considered. In such context, further investigation on the ageless "*quis custodiet custodes?*" issue may be relevant, since the European law prescribes only a program of contents for hunters training, without actually identifying professional figures who are nominated actually as 'educated trainers'. In fact, it can be hypnotized that this could be one of the issue causing different levels of hunting training. In addition, making hunters aware of their role as producers could make them conscious of the potential risk of producing HWGM meat in an *unprofessional* manner, enhancing the centrality of their role as possible food producers, responsible for consumers' health.

References

- Alicke, M. D., Klotz, M. L., Breitenbecher, D. L., Yurak, T. J., & Vredenburg, D. S. (1995). Personal contact, individuation, and the better-than-average effect. *Journal of personality and social psychology*, 68(5), 804.
- Avagnina, A., Nucera, D., Grassi, M. A., Ferroglio, E., Dalmaso, A., & Civera, T. (2012). The microbiological conditions of carcasses from large game animals in Italy. *Meat Science*, 91(3), 266–271. <https://doi.org/10.1016/j.meatsci.2012.01.025>
- Branciarri, R., Onofri, A., Cambiotti, F., & Ranucci, D. (2020). Effects of Animal, Climatic, Hunting and Handling Conditions on the Hygienic Characteristics of Hunted Roe Deer (*Capreolus capreolus* L.). *Foods*, 9(8), 1076. <https://doi.org/10.3390/foods9081076>
- Coldiretti Istat and Federcaccia data elaboration (Coldiretti, Quanti sono i cacciatori in Italia? Archiviato il 26 dicembre 2011 in Internet Archive.) accessed: 20 December 2022
- Corradini, A., Marescotti, M. E., Demartini, E., & Gaviglio, A. (2022). Consumers' perceptions and attitudes toward hunted wild game meat in the modern world: A literature review. *Meat Science*, 194, 108955. <https://doi.org/10.1016/j.meatsci.2022.108955>
- da Cunha, D. T., Braga, A. R. C., Passos, E. de C., Stedefeldt, E., & de Rosso, V. V. (2015). The existence of optimistic bias about foodborne disease by food handlers and its association with training participation and food safety performance. *Food Research International*, 75, 27–33. <https://doi.org/10.1016/j.foodres.2015.05.035>
- da Cunha, D. T., Stedefeldt, E., & de Rosso, V. V. (2014). He is worse than I am: The positive outlook of food handlers about foodborne disease. *Food Quality and Preference*, 35, 95–97. <https://doi.org/10.1016/j.foodqual.2014.02.009>
- de Andrade, M. L., Rodrigues, R. R., Antongiovanni, N., & da Cunha, D. T. (2019). Knowledge and risk perceptions of foodborne disease by consumers and food handlers at restaurants with different food safety profiles. *Food Research International*, 121, 845–853. <https://doi.org/10.1016/j.foodres.2019.01.006>
- de Andrade, M. L., Stedefeldt, E., Zanin, L. M., & da Cunha, D. T. (2020). Food safety culture in food services with different degrees of risk for foodborne diseases in Brazil. *Food Control*, 112, 107152. <https://doi.org/10.1016/j.foodcont.2020.107152>
- Demartini, E., Vecchiato, D., Marescotti, M. E., Gibbert, M., Viganò, R., Giacomelli, S., & Gaviglio, A. (2021). The more you know: The equivocal effects of prior knowledge on preferences for hunted vs. farmed wild boar meat. *International*

Journal of Gastronomy and Food Science, 24, 100325.
<https://doi.org/10.1016/j.ijgfs.2021.100325>

Demartini, E., Vecchiato, D., Tempesta, T., Gaviglio, A., & Viganò, R. (2018). Consumer preferences for red deer meat: A discrete choice analysis considering attitudes towards wild game meat and hunting. *Meat Science*, 146, 168–179.
<https://doi.org/10.1016/j.meatsci.2018.07.031>

Dickson, B., Hutton, J., & Adams, W. M. (Eds.). (2009). *Recreational Hunting, Conservation and Rural Livelihoods*. Wiley-Blackwell.
<https://doi.org/10.1002/9781444303179>

Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment: Implications for health, education, and the workplace. *Psychological science in the public interest*, 5(3), 69-106.

European Parliament and of the Council Regulation (EC) No 883/2004 of the European Parliament and of the Council of 29 April 2004 laying down specific hygiene rules for food of animal origin -Available online: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:32004R0853> accessed 16 August 2022

Evans, E., Samuel, E., Redmond, E., & Taylor, H. (2021). Exploring *Listeria monocytogenes* perceptions in small and medium sized food manufacturers: Technical leaders' perceptions of risk, control and responsibility. *Food Control*, 126, 108078. <https://doi.org/10.1016/j.foodcont.2021.108078>

Fiala, M., Marveggio, D., Viganò, R., Demartini, E., Nonini, L., & Gaviglio, A. (2020). LCA and wild animals: Results from wild deer culled in a northern Italy hunting district. *Journal of Cleaner Production*, 244, 118667.
<https://doi.org/10.1016/j.jclepro.2019.118667>

Fredriksson-Ahomaa, M. (2019). Wild Boar: A Reservoir of Foodborne Zoonoses. *Foodborne Pathogens and Disease*, 16(3), 153–165.
<https://doi.org/10.1089/fpd.2018.2512>

Gamborg, C., & Jensen, F. S. (2017). Attitudes towards recreational hunting: A quantitative survey of the general public in Denmark. *Journal of Outdoor Recreation and Tourism*, 17, 20–28. <https://doi.org/10.1016/j.jort.2016.12.002>

Gaviglio, A., Demartini, E., & Marescotti, M. E. (2017). *The creation of a local supply chain for large wild ungulates meat: Opportunities and limitation from an Italian alpine case study*. *Calitatea*, 18(S2), 215-222., 9.

- Gaviglio, A., Marescotti, M., & Demartini, E. (2018). The Local Value Chain of Hunted Red Deer Meat: A Scenario Analysis Based on a Northern Italian Case Study. *Resources*, 7(2), 34. <https://doi.org/10.3390/resources7020034>
- Gill, C. O. (2007). Microbiological conditions of meats from large game animals and birds. *Meat Science*, 77(2), 149–160. <https://doi.org/10.1016/j.meatsci.2007.03.007>
- Gomes-Neves, E., Abrantes, A. C., Vieira-Pinto, M., & Müller, A. (2021). Wild Game Meat—A Microbiological Safety and Hygiene Challenge? *Current Clinical Microbiology Reports*, 8(2), 31–39. <https://doi.org/10.1007/s40588-021-00158-8>
- Guardone, L., Armani, A., Mancianti, F., & Ferroglio, E. (2022). A Review on *Alaria alata*, *Toxoplasma gondii* and *Sarcocystis* spp. in Mammalian Game Meat Consumed in Europe: Epidemiology, Risk Management and Future Directions. *Animals*, 12(3), 263. <https://doi.org/10.3390/ani12030263>
- Harris, P., & Middleton, W. (1994). The illusion of control and optimism about health: On being less at risk but no more in control than others. *British Journal of Social Psychology*, 33(4), 369-386.
- Hartmann, C., & Siegrist, M. (2020). Our daily meat: Justification, moral evaluation and willingness to substitute. *Food Quality and Preference*, 80, 103799. <https://doi.org/10.1016/j.foodqual.2019.103799>
- Hedman, H. D., Varga, C., Duquette, J., Novakofski, J., & Mateus-Pinilla, N. E. (2020). Food Safety Considerations Related to the Consumption and Handling of Game Meat in North America. *Veterinary Sciences*, 7(4), 188. <https://doi.org/10.3390/vetsci7040188>
- Helweg-Larsen, M., & Shepperd, J. A. (2001). Do Moderators of the Optimistic Bias Affect Personal or Target Risk Estimates? A Review of the Literature. *Personality and Social Psychology Review*, 5(1), 74–95. https://doi.org/10.1207/S15327957PSPR0501_5
- Hoffman, L. C., & Wiklund, E. (2006). Game and venison – meat for the modern consumer. *Meat Science*, 74(1), 197–208. <https://doi.org/10.1016/j.meatsci.2006.04.005>
- Hutton, Adams, & Dickson. (2009). *Recreational hunting, conservation and rural livelihoods: Science and practice*.
- Jespersen, L., & Huffman, R. (2014). Building food safety into the company culture: A look at Maple Leaf Foods. *Perspectives in Public Health*, 134(4), 200–205. <https://doi.org/10.1177/1757913914532620>
- Istat 2015-2016 Data elaboration curate by Armi e tiro <https://www.armietiro.it/il-numero-vero-dei-cacciatori->

10404#:~:text=I%20cacciatori%20italiani%20erano%201.701,stagione%20dei%20tr e%20referendum%20anticaccia accessed: 20 December 2022

Ljung, P. E., Riley, S. J., & Ericsson, G. (2015). Game Meat Consumption Feeds Urban Support of Traditional Use of Natural Resources. *Society & Natural Resources*, 28(6), 657–669. <https://doi.org/10.1080/08941920.2014.933929>

Ljung, P. E., Riley, S. J., Heberlein, T. A., & Ericsson, G. (2012). Eat prey and love: Game-meat consumption and attitudes toward hunting. *Wildlife Society Bulletin*, 36(4), 669–675. <https://doi.org/10.1002/wsb.208>

Lund, B. M., & O'Brien, S. J. (2011). The Occurrence and Prevention of Foodborne Disease in Vulnerable People. *Foodborne Pathogens and Disease*, 8(9), 961–973. <https://doi.org/10.1089/fpd.2011.0860>

Marescotti, M. E., Caputo, V., Demartini, E., & Gaviglio, A. (2019). Discovering market segments for hunted wild game meat. *Meat Science*, 149, 163–176. <https://doi.org/10.1016/j.meatsci.2018.11.019>

Marescotti, M. E., Caputo, V., Demartini, E., & Gaviglio, A. (2020). Consumer preferences for wild game cured meat label: Do attitudes towards animal welfare matter? *International Food and Agribusiness Management Review*, 23(4), 599–618. <https://doi.org/10.22434/IFAMR2019.0203>

Marescotti, M. E., Demartini, E., Gibbert, M., Viganò, R., & Gaviglio, A. (2021). Disentangling Individual Phases in the Hunted vs. Farmed Meat Supply Chain: Exploring Hunters' Perceptions in Italy. *Foods*, 10(1), 174. <https://doi.org/10.3390/foods10010174>

Miles, S., & Scaife, V. (2003). Optimistic bias and food. *Nutrition Research Reviews*, 16(01), 3. <https://doi.org/10.1079/NRR200249>

Nkosi, D. V., Bekker, J. L., & Hoffman, L. C. (2021). Toxic Metals in Wild Ungulates and Domestic Meat Animals Slaughtered for Food Purposes: A Systemic Review. *Foods*, 10(11), 2853.

Orsoni, F., Romeo, C., Ferrari, N., Bardasi, L., Merialdi, G., & Barbani, R. (2020). Factors affecting the microbiological load of Italian hunted wild boar meat (*Sus scrofa*). *Meat Science*, 160, 107967. <https://doi.org/10.1016/j.meatsci.2019.107967>

Paulsen, P.; Bauer, A.; Vodnansky, M.; Winkelmayr, R.; Smulders, F.J.M.; Paulsen, P.; Bauer, A. (2011). *Game Meat Hygiene in Focus Microbiology, Epidemiology, Risk Analysis and Quality Assurance: Vol. Wageningen Academic Publishers.*

Paulsen P, Smulders FJM, Hilbert F. Salmonella in meat from hunted game: a central European perspective. *Food Res Int.* 2012;45(2):609–16. <https://doi.org/10.1016/j.foodres.2011.06.055>.

- Paulsen, P., & Winkelmayr, R. (2004). Seasonal variation in the microbial contamination of game carcasses in an Austrian hunting area. *European Journal of Wildlife Research*. <https://doi.org/10.1007/s10344-004-0054-z>
- Perloff, L. S., & Fetzer, B. K. (1986). Self–other judgments and perceived vulnerability to victimization. *Journal of Personality and social Psychology*, 50(3), 502.
- Peruzy, M. F., Murru, N., Smaldone, G., Proroga, Y. T. R., Cristiano, D., Fioretti, A., & Anastasio, A. (2022). Hygiene evaluation and microbiological hazards of hunted wild boar carcasses. *Food Control*, 135, 108782. <https://doi.org/10.1016/j.foodcont.2021.108782>
- Peterson, M. N. (2004). An approach for demonstrating the social legitimacy of hunting. *Wildlife Society Bulletin*, 32(2), 310–321. [https://doi.org/10.2193/0091-7648\(2004\)32\[310:AAFDTS\]2.0.CO;2](https://doi.org/10.2193/0091-7648(2004)32[310:AAFDTS]2.0.CO;2)
- Ranucci, D., Roila, R., Miraglia, D., Arcangeli, C., Vercillo, F., Bellucci, S., & Branciarri, R. (2019). Microbial, chemical-physical, rheological and organoleptic characterisation of roe deer (*Capreolus capreolus*) salami. *Italian Journal of Food Safety*, 8(3). <https://doi.org/10.4081/ijfs.2019.8195>
- Ranucci, D., Roila, R., Onofri, A., Cambiotti, F., Primavilla, S., Miraglia, D., Andoni, E., Di Cerbo, A., & Branciarri, R. (2021). Improving Hunted Wild Boar Carcass Hygiene: Roles of Different Factors Involved in the Harvest Phase. *Foods*, 10(7), 1548. <https://doi.org/10.3390/foods10071548>
- Rossi, M. de S. C., Stedefeldt, E., da Cunha, D. T., & de Rosso, V. V. (2017). Food safety knowledge, optimistic bias and risk perception among food handlers in institutional food services. *Food Control*, 73, 681–688. <https://doi.org/10.1016/j.foodcont.2016.09.016>
- Sales, J., & Kotrba, R. (2013). Meat from wild boar (*Sus scrofa* L.): A review. *Meat Science*, 94(2), 187–201. <https://doi.org/10.1016/j.meatsci.2013.01.012>
- Schulp, C. J. E., Thuiller, W., & Verburg, P. H. (2014). Wild food in Europe: A synthesis of knowledge and data of terrestrial wild food as an ecosystem service. *Ecological Economics*, 105, 292–305. <https://doi.org/10.1016/j.ecolecon.2014.06.018>
- Sevillano Morales, J., Moreno-Ortega, A., Amaro Lopez, M. A., Arenas Casas, A., Cámara-Martos, F., & Moreno-Rojas, R. (2018). Game meat consumption by hunters and their relatives: A probabilistic approach. *Food Additives & Contaminants: Part A*, 35(9), 1739–1748. <https://doi.org/10.1080/19440049.2018.1488183>
- Shaw, D. L. (1973). *The hunting controversy: Attitudes and arguments*.

- Shepperd, J. A., Klein, W. M. P., Waters, E. A., & Weinstein, N. D. (2013). Taking Stock of Unrealistic Optimism. *Perspectives on Psychological Science*, 8(4), 395–411. <https://doi.org/10.1177/1745691613485247>
- Shepperd, J. A., Pogue, G., & Howell, J. L. (2017). Assessing the consequences of unrealistic optimism: Challenges and recommendations. *Consciousness and Cognition*, 50, 69–78. <https://doi.org/10.1016/j.concog.2016.07.004>
- Siegrist, M., & Árvai, J. (2020). Risk Perception: Reflections on 40 Years of Research. *Risk Analysis*, 40(S1), 2191–2206. <https://doi.org/10.1111/risa.13599>
- Thomas, V. G., Pain, D. J., Kanstrup, N., & Green, R. E. (2020). Setting maximum levels for lead in game meat in EC regulations: An adjunct to replacement of lead ammunition. *Ambio*, 49(12), 2026-2037.
- Tolušić, Z., Florijančić, T., Kralik, I., Sesar, M., & Tolušić, M. (2006). Game meat market in Eastern Croatia. *Poljoprivreda*, 12(2), 9.
- Tomasevic, I., Novakovic, S., Solowiej, B., Zdolec, N., Skunca, D., Krocko, M., Nedomova, S., Kolaj, R., Aleksiev, G., & Djekic, I. (2018). Consumers' perceptions, attitudes and perceived quality of game meat in ten European countries. *Meat Science*, 142, 5–13. <https://doi.org/10.1016/j.meatsci.2018.03.016>
- Viganò, R., Demartini, E., Riccardi, F., Corradini, A., Besozzi, M., Lanfranchi, P., Chiappini, P. L., Cottini, A., & Gaviglio, A. (2019). Quality parameters of hunted game meat: Sensory analysis and pH monitoring. *Italian Journal of Food Safety*, 8(1). <https://doi.org/10.4081/ijfs.2019.7724>
- Weinstein, N. D. (1989). Optimistic biases about personal risks. *Science*, 246(4935), 1232-1233.
- Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, 90(2), 245e271. Retrieved from <http://psycnet.apa.org/index.cfm?fa¼buy.optionToBuy&id¼1981-30307-001>.
- Zanin, L. M., Stedefeldt, E., & Luning, P. A. (2021). The evolvement of food safety culture assessment: A mixed-methods systematic review. *Trends in Food Science & Technology*, 118, 125–142. <https://doi.org/10.1016/j.tifs.2021.08.013>

CHAPTER IV

Rethinking the role of ‘the hunter’ in the postmodern era: a case study from the Grisons Canton, Swiss

Annafrancesca Corradini*¹, Lisa Märzc², Anna Gaviglio¹, Michael Gibbert²

¹ Department of Veterinary Science for Health, Animal Production and Food Safety, University of Milano, Via dell’Università 6, 26900 Lodi, LO, Italy

² USI Università della Svizzera italiana, Via G. Buffi 13, 6900, Lugano, Switzerland

Abstract

Recreational hunting, in some Western countries is strongly criticized and is facing a crisis regarding its role. Literature claims that, unless they do not redefine their activity, hunters may lose their social license in the near future. In this sense, we argue that hunting, through the figure of the hunter, is already reconfiguring itself and adapting to the postmodern condition. To investigate on this theme, a case study from the canton of Grisons is presented. In-depth interviews has been performed with hunters from Val Bregaglia, in order to gain essential piece of knowledge to rethink the hunter figure in a post-modern key, try to understand which new value and identities are associated with hunting.

1. Introduction

In the last decades hunting has become difficult to endorse by western societies given that it is a recreational activity (i.e., not practiced for subsistence) which implies the killing of a wild animal (Fischer et al., 2013). Thus, if hunters do not want to succumb to criticism, they need to undertake a shift that allows them to keep their ‘*social licence*’ (Hampton & Teh-White, 2019). In a postmodern world, where the crisis of values is constantly challenging tradition by creating new humane spaces and liquid identities (Bauman, 1988), we argue that also ‘the hunter’ must reframe their role in society. In this connection, the literature may suggest several clues to theorize hunters’ adaptation to the postmodern world: hunters seem to slightly transform their public persona. Borrowing a headline from The New York Times, hunters are now described as “environmentalists with guns” (Wollan, 2022), people who enjoy staying in and preserving nature while providing for their food by/for themselves. The stereotype of the western hunter as a white rural male seems somewhat falling apart, leaving space to new identities entering the hunting arena (Heberlein et al., 2008; Gigliotti & Metcalf, 2016; Birdsong et al., 2022). Literature reports that the number of female hunters is growing worldwide, and more people living in urban areas are interested in engaging in this activity (Quartuch et al., 2017). Starting from these premises, the next sections (1.1, 1.2., 1.3.) will offer brief glimpses into the literature related to the main themes exemplifying how hunting is adapting to the post-modern era.

1.1 Hunting as a tool to manage wildlife: the hunter as a ‘responsible citizen’

Although in the past recreational hunting pressure has proved to be destructive for different species worldwide (Di Minin et al., 2021), today the role of hunting, thanks to strict regulations, has changed (Dickson et al., 2009; Heffelfinger et al., 2013). Recreational hunters are considered essential for the regulation of some wildlife populations, especially meant for the effective control of problematic species (Massei

et al., 2015; Quirós-Fernández et al., 2017). To better frame this concept, it seems appropriate to mention the well-known example of wild boar (*Sus scrofa*). Wild boar populations are overabundant in some areas of Europe (such as Spain and Italy) (Massei et al., 2015) and their presence becomes problematic when it interferes with anthropic activities such as agriculture (Ficetola et al., 2014), causes traffic accidents (Morelle et al., 2013), and threatens farmed animal health (Frant et al., 2020). Literature explains that the management of wild species is literally "in hunters' hands" (Quirós-Fernández et al., 2017), often emphasizing the importance of the role of hunters for 'pest control'. In this sense, the extractive nature of hunting as a form of wildlife consumption is claimed to play a vital role in preserving the balance of ecosystems (Quirós-Fernández et al., 2017). Moreover, regulated hunting remains at the same time the cornerstone of wildlife management, since in some systems (such as in the U.S.A.) it is crucial for its financial support (Heffelfinger et al., 2013; Arnett and Southwick, 2015). Interestingly, Price Tack et al (2018) highlighted an institutional lack of mechanisms to gain financial support from other wildlife enthusiasts who are different from hunters (e.g., hikers and wildlife watchers). This means that, although among wildlife enthusiasts hunters represent a minority, perpetuating a consumptive use of wildlife, they still provide economic sustainability in support of wildlife conservation. Thus, hunters serve the ecosystem (Quirós-Fernández et al., 2017) to the point that in the context of wildlife monitoring they have been also identified by a recent study as citizen scientists (Cretois et al., 2020), able to provide fundamental data for the conservation of biodiversity.

1.2 The hipster ideal of food self-sufficiency: the hunter as a 'responsible consumer'

The discourse related to self-sufficiency seems one of the most employed to enhance the value of hunting in western cultures (Stedman et al., 2017) and western consumers declared to appreciate hunted wild game meat characteristics (Demartini et al., 2018; Marescotti et al., 2019). Over the past two decades, some popular authors like Michel Pollan (2006) and Tovar Cerulli (2012) brought public attention to the so-called locavore movement. The locavores can be defined as conscious consumers,

who want to eat healthy food and follow sustainable lifestyles by supporting local food systems (Peterson et al., 2015; Stedman et al., 2017). Locavores can be motivated by ethical concerns related to personal beliefs or they may perceive local food as healthier and even safer (i.e., the so-called ‘natural-is-better’ heuristic) (Stedman et al., 2017). Hunting finds its place in such motives as an alternative way for consumers to become ‘producers’ of their own’s food (in just the same way as harvesting and fishing). In this sense, hunting has the advantage of solving the omnivore paradox (Pollan, 2006). In fact, the disconnection with death produced by the industrial slaughtering of farmed animals seems to have brought consumers to a cognitive dissonance, often reporting difficulties in recognizing that meat derives from animals (Benningstad & Kunst, 2020). The idea that hunting is an ethical and sustainable way to produce one’s own food finds its followers in young urbans, people with romantic back-to-the-countryside ideals (Moran, 2012), defined by Elliott (2016) as “hipster hunters”. Such an emerging niche of consumers which links their consumption to political and ethical issues, appears to represent a meaningful example of the hunting adaptation in the post-modern era, since they reframe the role of hunting in terms of food quality and sustainability.

1.3. An army of new Artemis: female hunters’ participation in a traditionally male dominated arena

Current literature documents a growth in the number of women hunters participating in recreational hunting both in U.S. and Europe (Heberlein et al., 2008). The number of studies that investigate on female hunters is growing (Heberlein et al., 2008; Metcalf et al., 2015; Gigliotti & Metcalf, 2016; Smith et al., 2022), especially in the gender studies domain (Lindemann et al., 2022), and more broadly connected to analyses of non-traditional patterns for undertaking hunting activity (Quartuch et al., 2017; Birdsong et al., 2022). Women entering traditionally dominated male arenas represent a phenomenon significantly reported also in other sectors, for example football (Jeanes, 2011), suggests a renegotiation of traditional gender roles and identities in leisure activities, such as hunting (Giacomelli & Gibbert, 2018).

Regarding the second area of research, especially in the U.S.A., female hunters are studied because they represent an interesting group for future hunter recruitments (Heberlein et al., 2008). In this context, the number of female hunters started to increase in the 1990s, while general participation in hunting decreases (Fitzgerald, 2005). The latter stream of studies has focused on the motivation of women to become hunters and report a similar motivation between male and female hunters, namely having been inspired by hunters in their family (Metcalf et al., 2015). However, ‘hunting for meat’ purposes was higher in retention motivations and, slightly higher in the female population (Gigliotti & Metcalf, 2016). An interesting survey on the female hunter population conducted in Denmark reported that women started hunting at a higher age than men, were less devoted to hunting during the season, and spent less money on this activity (Rodriguez, 2016)

Evidently hunting is being reformulated. The western hunter seems to be pursuing motivations and justifications to engage in the activity of hunting, that can hardly stand up to the argument of maintaining a tradition alone. Our work, therefore, set out to answer the question: how hunters are re-framing their identity in the postmodern society? To achieve this goal, we conducted an exploratory case study and examined emerging differences in hunters' experiences, their self-perceived roles within and outside the hunting community, and their motivations and identities in the unexplored context of Grisons, Switzerland.

1.4 Swiss hunting: the Grisons as case in point

For this case study, we chose to focus our attention to Grisons, Switzerland, as a particular context, where attention is strongly paid to animal rights and human-animal relationships. Switzerland has been recognized to be pioneering in the field of animal law, ranking among the most progressive countries in the World Animal Protection Index. The Animal Welfare act of 2005 recognizes animals as sentient, and the consequent Animal Welfare Ordinance (2020) was set to “establish anti-cruelty protections and basic standards of case animals”. However, as highlighted in the

Animal Protection Index report, even if wild animals are theoretically protected by the general anti-cruelty prohibitions of the Animal Welfare Act (2005) and Animal Welfare Ordinance (2020), Switzerland is blamed to permit “cruel hunting methods”. The paradox that emerges here can be explained by the fact that hunting is strongly embedded in Swiss culture, especially in Grisons, where the number of hunters is the highest in Switzerland (Swiss hunting statistics, Federal Office for the Environment, FOEN, 2021). Compared to other countries which register a decrease of hunters due to an insufficient generational turnover (Massei et al., 2015; Birdsong et al., 2022), it is interesting to note that the number of hunters remains relatively stable in Switzerland, and the number of female hunters has grown in the last years (Swiss Jagdstatistik, Bundesamt für Umwelt, 2021). As far as we know, hunting in Switzerland has been minimally investigated but it may represent a particularly interesting case study. For example, here, opposite methods of wildlife management coexist in a relatively limited territory. On the one hand there is Grisons, a self-proclaimed innovator in hunting regulations, that aims at protecting animals and the land, where hunting is profusely part of the culture and highly practiced (and then, criticized); on the other there is the canton of Geneva where hunting is prohibited since 1977: here, the cantonal administration has the task of monitoring and regulating wildlife (Gerber et al., n.d.).

Since the end of the XIX century, hunting in Switzerland is regulated independently by each canton. In Grisons, since 1526 all citizens held the (almost) exclusive right to participate in hunting according to the principle of *freie Jagd* [free hunt], which still partially persists today. Then, in 1874, due to the decrease of wildlife, caused mainly by an uncontrolled hunting pressure (i.e., *Capra ibex* and *Cervus elaphus* were nearly extinct), the Confederation implemented a national regulation of hunting, leaving the hunting regalia to each canton. For example, a canton has the power to dispose of fauna and to regulate and plan the hunting management on its territory, while the Confederation decides which species can be hunted, when and where they can be hunted, and with which weapon (Gerber et al., 2008). Apart from the canton of

Geneva (state regulation system, hunting prohibition), the other two systems for wildlife management in Switzerland are the *Revierjagd* (rental-based system), for which one must be a member of an association that holds the hunting area to gain the right to hunt; and the *Patentjagd* (licence system), for which hunters technically ‘buy’ the permission from the canton. After 1986, a reform of the wildlife regulation was introduced with the aim of strictly managing the quota of animals that can be culled every hunting season to preserve the fauna, according to the data that indicate the population status. In Grisons four types of hunting coexist. The *Hochjagd* (1) is the most practiced and popular. The hunted species are deer, roe deer, chamois, wild boar, marmot, fox, and badger. It is practiced in the month of September for a maximum of 21 days. The Ibex hunting (2) is permitted only after and every five years of the *Hochjagd*. The *Niederjagd* (3) is the hunting of predominantly birds and hare. And then there is the *ambush* hunting (4), where the hunted species are predominantly fox and badger. The right to hunt in Grisons is granted to 19-year-old citizens after they have passed an aptitude test. Interestingly, Grisons has set some technical limitations and strict indications to hunters, especially related to the *Hochjagd*. Apart from the limited period of the hunting activity, the ammunition used to hunt must have a minimum caliber of 10.2 mm. The most popular caliber is therefore 10.3 mm. 10.3 is a big caliber compared to the standard usually employed for ungulates hunting (7 or 8 mm). This means that it is a powerful caliber, with high impact force, which does not allow long shots. Thus, the hunter can shoot at a maximum distance of 100 to 150 meters to be sure of the success of their performance. In addition, a mandatory shooting test is imposed annually for hunters before the opening of the hunting season, and the use of lead ammunition is forbidden. Furthermore, the use of vehicles to reach the hunting areas is strictly limited. For these reasons, Grisons appears to be a place where technical constraints may act as funding pillars of hunting ethics. However, although Grisons’ hunting has been highly condemned in the recent years by the general public, it remains protected and supported by the local citizen and cantonal government (see e.g., the initiative

Für eine naturverträgliche und ethische Jagd [“For a nature-friendly and ethical hunting”].

2. Methodological approach

The present study is based on a qualitative case study. Case study research requires a form of empirical investigation that examines a phenomenon “in-depth and within a real-life context” (Yin, 2018). As outlined by Meredith (1998), this method appears particularly appropriate if allied to exploratory research of emerging phenomena, where the boundaries between the context and the phenomenon seems unclear (Stake, 1995). Case studies can be implemented when actors cannot be controlled (Yin, 2018). Thus, they offer a strategy of investigation that enables the researchers to explore in detail the social process (Lindgreen et al., 2021). To construct its validity (Gibbert & Ruigrok, 2010), a case study needs to be built with data triangulation, i.e., data deriving from multiple sources as interviews, observations, and archives (Eisenhardt, 1989). In the present study, data were collected by using in-depth face-to-face semi structured interviews with hunters (primary data), fieldnotes, and archive material. In particular, following seven criteria to conduct rigorous research outlined by Gibbert et al. (2008) and Gibbert & Ruigrok (2010), the subsequent paragraph will illustrate in detail how the study was conducted.

2.1 Study setting

The study has been carried out in Grisons, Switzerland, specifically in Val Bregaglia during November 2021 and March 2022. We chose Val Bregaglia because the Italian language is spoken fluently by its residents, which was a necessity for the first author who conducted this research as an Italian native. Val Bregaglia is a little valley which extends from the Maloja Pass to Chiavenna at the Italian border (Collenberg, 2005). In Grisons the official languages are German, Italian, and Rumantsch Grischun (a Gallo-Roman language recognized in Switzerland since 1938, official since 1996).

For our interviews we took the different languages to our advantage. As a native Italian, the first author of this paper predominantly managed the networking and fieldwork, and conducted the interviews with Italian-speaking subjects. The second author functioned as a gatekeeper for the first author to overcome the language barrier with German-speaking subjects in interview requests and one live interview.

In July and September 2021, two preliminary visits to the study area were organized to establish the first contact with the hunting community. The key-figures which allowed us to enter the community were two wildlife guards who introduced us to a Bregaglia valley hunters association.

Due to the qualitative nature of the research, the interviewed represent a non-probability sample. The analysis is based on semi-structured interviews with open ended questions which were predominately conducted on the field. The first author was, when there were no situational impediments (related mainly to the time respondents could devote to the interviews and the project's financial constraints), hosted in the homes of seven interview participants. Another three interviews were conducted via video call. It is important to highlight that the first author is born in a family of hunters and practices hunting herself. Thus, she is an insider of the hunters' community. As it is common in ethnographic fieldwork, being an insider may have some advantages and disadvantages and can have a positive effect on the access to the community or a negative one, depending on the insider position in the community. To minimize a biased interpretation during data analysis, it requires a high level of reflexivity of the researcher. As suggested by Dwyer and Buckle (2009), the insider-outsider binary categorization can be too simplistic: the space between the two positions can never be certain since the researcher may change the perspective or their point of view during the observation of the phenomenon. However, to overcome this uncertain space, our research is led by the author's competence to involve and detach (Fassin 2013) herself as both the researcher and hunter that she is.

The first in depth-interview with two hunters affiliated to the local hunter association (a young man and his father) allowed us to obtain first information about the

Bregaglia hunting community. This meeting was organized during their hunting lodge at the end of the *Hochjagd* period and lasted about two hours, and was an informal in-depth conversation about the past and the present hunting system (before and after the hunting reform 1989), which allowed us to gain knowledge on the history of the hunting regulation in the Canton and its further development. After the first meeting it was thus possible to draw some pattern to follow.

For the following interviews, hunters were first contacted via telephone or mail by the first author who illustrated her background (as a researcher) and the general purpose of the interview. The first author contacted fifteen hunters: three of them did not answer the mail and/or SMS, two of them (elder female hunters) rejected the interview. The explanation given by one of them was: *“I used to hunt, non-frequently, and I can hardly remember something about the experience”*. Participants were free to choose the location they thought would be most comfortable for them to perform the interview at. Although it was not possible to organise a hunting day with any participants, some of them hosted the researcher in their homes or hunting lodges. Others (two elderly male hunters) had explained to feel more comfortable organizing the interview in places defined by them as “neutral” (one was the most frequented bar of the valley, and one was in a church). Even though they had consented to the interview, they asked for more detail about the project before the meeting. Only one of the interviewees opened up about his initial prejudice against the researcher, reporting at the end of the interview *“I was very concerned that you [the first author] were an undercover ‘green’ and that you just came here to pry into our [hunters community] business to criticize us”*. This prejudice may have been enforced by the fact that the first author is a young woman and the interlocutor in this case was an elderly man.

2.3 Analysis of content

Participants were asked to give their verbal informal consent before the interview. The ten interview sessions were registered and transcribed (9 were translated from

Italian to English by the first author, 1 was translated from German to English by the second author). The duration of the interviews varied from a minimum of 53 to a maximum of 138 minutes. The analysis of content was carried out manually, enabling the researcher to maintain a closeness to the data, and preventing her from early finalization (Basit, 2003; Mattimoe et al., 2021). Findings were elaborated in organized meetings with the other authors. Content was elaborated and categorized through a thematic analysis, according to their explicit and implicit meanings, and analysed by identifying patterns and processes, commonalities and differences. To guarantee the anonymity of the interviewees, pseudonyms are used throughout the paper.

3. Preliminary findings

As was suggested at the beginning of the manuscript, it is possible to see that shifts in reference to the figure of the hunter, as hunting must adapt to the post-modern era. In the following sections we present the preliminary results that we gained from the coding of the interviews so far (the process is still ongoing). To reach our aim we organized the interview questions into a set of key themes that seek to identify the features of new hunters' identities, with the ultimate goal of contributing to the sociological literature, by providing a novel key of interpretation of the role of the hunter from a postmodern perspective. Table 1 briefly summarize the characteristics of any participants.

Table 1. Hunters' characteristics

Pseudonym	Age	Description	Hunting information
Diana	39	Born in Val Bregaglia, living outside the valley, physiotherapist	Started hunting at 27 years old, she practices <i>Hochjagd</i> (deer, roe deer, occasionally chamois)
Roberta	32	Born in Val Bregaglia, living outside the valley, bank employee	Started hunting at 19 years old, she practices <i>Hochjagd</i> (deer, roe deer, predominately chamois)
Stella	35	Born in Val Bregaglia, living outside the valley, kindergarten teacher	She obtained the licence at 20 years old, she started hunting at 30, she practices <i>Hochjagd</i> (deer, roe deer, predominately chamois); ambush hunting (fox)
Tonia	55	Born in Davos, living outside Grisons, assistant, and photo reporter local media	Started hunting at 50 years old, she practices <i>Hochjagd</i> (deer, roe deer, chamois)
Daniele	24	Born in Val Bregaglia, living outside the valley, metalworker	Started hunting at 19 years old, and he practices <i>Hochjagd</i> (deer, roe deer, chamois); <i>Niederjagd</i> (hare and black grouse); ambush hunting (fox)
Mattia	30	Born in Val Bregaglia, living in the valley, employee	Started hunting at 25 years old, and he practices <i>Hochjagd</i> (deer, roe deer, chamois, and marmot)
Christian	48	Born in Val Bregaglia, living in the valley, employee	Started hunting at 20 years old, and he practices <i>Hochjagd</i> (deer, roe deer, chamois), <i>Niederjagd</i> (hare)
Giovanni	68	Born in Val Bregaglia, living in the valley, retired	Started hunting at 20 years old, and he practices <i>Hochjagd</i> (deer, roe deer, chamois). He practiced <i>Niederjagd</i> for 10 years
Leonardo	76	Born in Val Bregaglia, living in the valley, retired	Started hunting at 19 years old, and he practices <i>Hochjagd</i> (deer, roe deer, chamois)
Stefano	77	Born in Val Bregaglia, living in the valley, retired	Started hunting at 33 years old, and he practices <i>Hochjagd</i> (deer, roe deer, chamois)

3.1 *Becoming a hunter.*

“Hunting is literally everywhere here. Since I was a child, at home every conversation was about nature, animals, and hunting. My father used to take me with him in the forest during the hunting season, I grew with hunting in my blood.” (Stella)

The hunting licence had been obtained by most of our respondents at a young age (20-30), except in the case of Tonia, who obtained it when she was 50. When asked about their first contact with hunting, regardless their age or gender, similar themes were identified. The most common theme that recurred in all the interviews was socialization. All the hunters have stated that their first approach with the hunting world was triggered by a key-figure, important to them in their childhood. In eight

cases (three young women, two young men, and three elder men) this figure had been a near relative:

“My grandfather and my father used to hunt. Thus, I started to hunt, too. (...) For us [people from Graubünden], hunting is normal, is something that we just do” (Daniele). Sometimes it had been a friend or a close person: *“I was born here, so I have always seen people hunting. No one in my family was a hunter, but all my friends’ families and my partners’ family were families of hunters. I was invited to go with a friend a few years ago, I enjoyed that.”* (Manuel)

It was interesting to see that all women hunters described a fascination for the figure of the hunter in their childhood, for example by Diana: *“I have always been fascinated by hunters (...) when I used to wait for them, coming back from hunting, I was always curious to know if they had caught an animal and listened to their stories”*. Tonia recounted that she had been fascinated by her neighbour, one of the few female hunters at the time, when she was a child growing up in the mountain: *“I always thought she was such a strong woman, back then she had to assert herself a lot among the men, but she also was a very strong woman. And this woman impressed me so much that I always thought, if you want to be a strong woman you have to be a hunter”*.

Becoming a hunter, however, is not only about socialization, but we also further identified the theme of ‘experiencing the wild mountain landscape during childhood’ as another motivation point. Participants narrated anecdotes about their childhood that proved their curiosity towards nature, both in all the young hunters and female hunters (and not in the three old hunters) to be a part of the “becoming a hunter” experiences. Closeness and an intense connection with nature during childhood played a prominent role for our interviewees. All the interviewed hunters grew up in the mountains (9 in Bregaglia valley and 1 in Davos). Our interviewees spoke about nature mainly with regard to two topics: their relationship with farmed and/or wild animals, and their relationship with the forest and/or the mountains. For Christian it

was both: *“At the age of 12, I started going into nature and finding ungulates' antlers, so I think it was nature and animals that called me to become a hunter”*

3.2 On the killing of animals and death

Another theme that we recognized during the interviews was the hunters' personal perceptions of death, particularly that of farmed and wild animals. Death came through two perspectives: the experience of the slaughtering of farmed animals during their childhood, and the act of killing of a wild roaming animal performed as a hunter. Regardless of age or gender, all hunters used the terms “normal” or “natural” to describe an animal's death. Giovanni told us, *“contact with death has always been there...is normal. As a child of farmers, I have always thought that killing an animal for food is natural and death is a part of life”*. With no differences, all interviewees linked this type of concept to ‘having grown up in a rural area’. Roberta recounted,

“I was never shocked to see an animal slaughtered... for as long as I can remember I always understood that the death of a cattle, for example, was necessary... and normal. That action only corresponds to having a steak on the table for dinner, nothing more”.

Moreover, some a similar wording of the description of individual feelings triggered by the experience of killing have been noticed during the interviews coding. The elderly men did not respond by describing their actual feelings, they rather described their actions. Emblematically, Giovanni said: *“It was a good shot, a female roe deer”*. Conversely, elderly women as well as younger hunters (male and female) recounted experiences that were characterized by the recurrency of certain feelings before and after the shot. Emotions such as fear (of making a mistake, hurting, and not killing the nonhuman animal), agitation, tension, a certain *“feeling of adrenalin”* (Diana) were expressed. The after-shot sensation was described as blended, where feelings like joy and relief were described for the good outcome of the performance, coexisting with emotion of sadness and shame of the act of killing.

“The first time I shot a deer, it had a strange effect on me... I really feel compassion for that animal and all the animals I shoot too. The day you no longer feel it, hunting becomes only a competition with another hunter, and you lose control over the action (...). One never knows if he has the right to kill” (Christian).

“[After pulling the trigger] it was such a deep sadness but at the same time, like, wow I was gifted this animal. I am not incredibly religious, actually, not at all. (..) But it was such an enormous mix of feelings, I was ashamed, I was happy, I was sad all at the same time. (...) But it’s not like you blast at an animal and then pull out the liquor bottle, that’s not the case for me.” (Tonia)

More so than the edibility of an animal, its species seems to play a role in eliciting compassion. Daniele, who hunts ungulates, but also birds and hares, says on this subject: *“(...) oh no, I don't shoot marmots. It's an easy hunt, they almost call you to be taken. I can't kill them, I really feel sorry for them”*.

3.3 Motivation

3.3.1 Eating the quarry: an act between motivation and self-legitimization

Slightly oversimplifying the matter, our interviewed hunters can be divided into two groups: (1) ‘I only hunt what I eat’, and (2) ‘I hunt whatever I like to hunt, and I eat it too’. Regarding (1), an interesting pathway emerged during the conversations which is related to the satisfaction originated by the self-procurement of the wild meat. Most of the hunters involved in the study (seven cases out of ten, including all four female hunters) argued that eating the prey after the kill is an essential part of the hunting experience and for some of them it is also the main motivation for hunting. All of our interviewed hunters hunt ungulates. Seeking for food as a means of self-sufficiency has been explicitly argued as the first motivation for hunting in three cases (Diana, Christian and Tonia). These findings find consistency with what has been described by (Birdsong et al., 2022): female hunters seem to be motivated by using hunting as an activity for meat procurement. Diana’s father was a butcher who taught her how to

dress the wild meat since she was a 9-year-old kid. She profusely talked about the meat as a motivation to hunt, stating:

“My idea of hunting was always: I want to be self-sufficient. I have always wanted to have a place where I could grow my own vegetables (..) Hunting it’s the same thing to go into the woods to pick blueberries or mushrooms for example. (...) Nowadays we don’t need it, but that’s the idea... You know, I eat my own meat and... it’s very organic ... I mean compared to other animals...”

Christian explained: *“I eat a lot of game, I am almost self-sufficient, I can provide food for my family”*. Another remarkable perspective on eating the quarrrel emerged during the interview with Tonia. She expressed a sense of pride in taking home the quarrrel and having her partner prepare its liver the same day as a celebration. The theme of honouring and celebrating the quarrrel as a gift of nature, almost in a religious way, was a theme that emerged explicitly during the interview with Giovanni who described the act of eating as the *“best way to give dignity to the act [of hunting]”*.

(2) The second group of hunters, represented by three interviewees, who expressed the theme ‘I hunt whatever I like to hunt, and I eat it too’, recounted that eating the meat of wild roaming animals was a part of the experience of hunting but not the motivation for it. Eating the killed is rather a justification in itself for hunters like Manuel: *“Yes, at least game meat is not farmed (...). Eating what I hunt it is ok, justifies what I do”*. Daniele explained, *“Hunting for me is not about meat procurement. Hunting in the mountains is exhausting (...) and eating the meat you hunt ... has a whole other flavour.”* Hunters were also asked to self-report their general meat consumption habits. Only two of them declared that they eat meat coming from the GDO. Arguments in favour of eating meat purchased from local butchers or deriving from an informal channel (animals farmed at home by some relatives or friends) were brought, emphasising the focus on the naturalness of the

(organic) meat and stressing the accent on animal welfare issues. In this regard, the answer given by Roberta can be an example:

“I buy more meat from my uncle who is a farmer, sometimes a few kilos of pork or beef, whatever there is. I try not to buy meat from supermarkets (...) you don't know where the meat comes from. I mean you know where it comes from, but you never tell how the animal was treated”.

3.3.2 Seeking for ‘nature’

Another pathway related to motivation that transpired from the interviews is related to the pursuit for a strong connection with nature as a way of escaping from everyday life. This motivation for hunting has been found to be stronger than the other motivations for two of the elder men, two young women, and one young man (Stefano, Leonardo, Roberta, Stella and Daniele) The ‘seeking for nature’ leitmotiv occurred also in the recounts of the other hunters, however, less prominent. For Roberta the search for nature goes even further than to escape, it is a means of maintaining identity: *“I need to go hunting to stay in the nature, to reconnect with myself...”*. Reconnection to nature has been described by Stella as a form of *“mediation”*, a holiday to get away from *“everyday life”*. Hunting also allows her to stay with herself: Stella has two children and lives far from the Bregaglia valley; she reaches her native home during the *Hochjagd* season, without her family. This temporal and spatial dimension has been described as a state of necessity also by Daniele, who works and lives in Chur, the capital of Grisons, and who returns to his native home every weekend to reach his mountain refuge: *“I really feel I need to go into the mountains alone, to hear, you know... my footsteps, the silence of the mountain”*. Stefano described the experience of nature as foundational to his personal vision of hunting. Stefano used to be a wildlife guard before the retirement (wildlife guards do not hunt). He went hunting before he became a guard and continued to hunt after his retirement, because *“Nature it's part of me”*, he says.

3.3.3 Camaraderie

Among the most interesting motivations we recognized that was a kind of socializing that can be defined as a sort of ‘camaraderie’. Two similar perspectives have been given by a senior hunter, Leonardo and a young hunter, Manuel. The former explained that hunting for him was mainly a way to,

“stay with friends, spending time together. (...) During the Hochjagd days we were together, sharing everything between hunting mates (...) The best part of a hunting day is when, after an exhausting day, you're with your friends, having dinner, drinking, laughing, and sharing stories”.

Leonardo said that he could no longer manage to hike in the mountains as he did when he was younger, with a tone of nostalgia. Manuel also reported to join hunting to stay with his friends.

3.4. ‘Being a hunter’: perspectives from in-and-out of the community

In the next sections, we will present findings that concern hunters' perceptions of their community and the negotiation of their own role as hunters in the social space outside the hunting community (i.e., in their everyday life space).

3.4.1 Hunters’ perceptions of their own community

Our findings reveal that every hunter interviewed belongs to their own hunting crew, a sub-social group of hunters embedded in the overall hunting community. These groups consist of “*selected*” (Leonardo, Manuel, Tonia) relatives and friends which have the role to support each other, like “*a chosen family*” (Roberta), and who share the same viewpoints.

Some hunters told us they preferred the solo-hunting experience because it allowed them to be more “*independent*” (Diana), and to better enjoy the hunting:

“I have a crew [...] but I prefer to hunt alone [...] If something goes for good, it's all because of me. If something goes wrong, it's my own mistake...I also carry the animal by myself [...] I do not want to depend on anyone.” (Stella)

However, to go hunting in groups or alone depends on the target species (deer is usually hunted in group) and the intrinsic risk linked to the method (chamois are hunted at high altitudes, so it is considered safer to hunt together with someone else). However, some conflicts within the community were revealed, too, mainly between the old and the new school of hunters (young male and female hunters). The recurrent theme here is the “*insane*” (Christian) competition among hunters. Stella explained,

“When the season opens, I also turn off my smartphone [...] hunters, especially the younger, share a lot of stuff in WhatsApp groups and I really can't stand it [...] In my opinion constantly sharing pictures of their quarrels during the first days of hunting creates a lot of competition.”

Christian said, *“Personally, I'm not impressed if someone tells me I killed like a number X of animals [...] for me it is more important to have a good time while hunting.”* Two senior hunters (Giovanni and Leonardo) had a negative opinion of young hunters, Giovanni explained: *“They have less time and more distractions [...] they consider hunting as a hobby, they do not care about the future of hunting [...] They always stay on their smartphone, and they do not know territories, they don't want to learn, they have internet!”* In contrast, Christian (who is in-between the old and the new generation) shared a very positive opinion of the new recruits: *“there is difference between the generations. We're going through a positive change [...] the new generation prefers nature without being obsessed with quarrel [...] hunting is a kind of a lifestyle”*. On the other hand, younger hunters see senior hunters as “*close*”, since they “*refuse*” changes. Daniele pointed out that, *“Senior hunters perhaps have a harder time adapting to laws that change very quickly, often not understanding that change is needed ...”* (referring specifically to the introduction of the free-lead

ammunition¹). Manuel stated: “*Older hunters are often jealous of their territory [...] you have to be careful about hunting in ‘your own area’ to avoid every sort of conflicts*”.

3.4.2. A focus on gender: what is like to be a female hunter in a ‘men’s world’?

Female hunters are a part of the ‘new hunters’ generation and represent a minority in the hunting community. During the interviews, female hunters were asked about the characteristics of the socialization with other hunters, and about how they think they were perceived by their male peers. All of them said they were the only women in their hunting crews, and that they would not go hunting with other female hunters. Some revealed the existence of a conflict based on gender stereotypes perpetuated mostly by senior male hunters: “*Senior hunters [outside of her group] ask me why I go hunting [...] they criticize my physical ability to bring animals down [to the mountains].*” Roberta.

The most recurrent discriminatory comment recounted by four women was: “*what are you doing here? You’re supposed to stay in the kitchen!*” (Diana, Tonia, Stella and Roberta). These comments had been made to them during training classes and at the firing range.

“There are so many men who hate that women go hunting [...] For example, since I started hunting, I’ve always been subjected to vulgar and sexist jokes...Every year, the same things. There is still a hostile climate for us [female hunters], and we are not taken seriously” (Stella).

Only Tonia opened up on her experience related to sexual advances:

“[...] at exhibitions you meet men that say, come to visit me in my hut, you don’t need to worry it won’t be cold, and such are the comments. And then you say thanks for the offer, but for that I already have my group, and I particularly go to hunt those with fur, you know. I always say it, with humour, I try. [...] Are you nuts, who do you think I am? They cannot accept that so well, there are in

¹ Anpassungen der Jagdbetriebsvorschriften 2020: Jagddruck auf Schalenwild wird im Wald verstärkt (gr.ch)

part machos among them, and that is how you can, well, I always handled it well. But I am not 25 years old and a sex bomb, you know, I am quite grounded and, yes, they know I'm in a good relationship. Exactly, my partner is equally accepted. [...] So, as a woman you can signal that very clearly. And if someone won't accept it you say bye, thanks."

However, these issues were never related to the women's selected hunting groups, which they described throughout by rather positive recounts. All four female hunters told us that they were being treated the same as men while hunting in their own groups: *"Inside my group, you know... when I need a hand, I ask for it. [...] and they ask me too when they need it [...]. When you are in the mountains, it doesn't matter if you are man or a woman, you help each other as much as you can"* (Roberta). Tonia confirmed, *"And in a group also a man needs help with a stag that weighs 150kg. (...) either you fly out (...) a deer with a helicopter or you have friends that help you. It's completely irrelevant if you're a man or a woman."*

On the other hand, male hunters were asked if they went hunting with female hunters, and about their perception of women entering the hunting arena.² All the men interviewed, especially the younger, made very positive remarks about female hunters. Daniele said: *"the increase of women, I think it is because the world has changed and they are no longer afraid to show their passions (...) I heard a lot of jokes about female hunters, by the way made by old men (...) but I think it is for fear... that they might catch more deer than them"*. Stefano has a daughter with whom he goes hunting and he remembered: *"There was only one woman, I think, when I started hunting (1977) (...) think it is very productive for hunting that there is a greater presence of women, their sensitivity is greater (...) they behave better than men."* Leonardo, talking generally about female and hunting in the past reported: *"When we go hunting, women used to stay at home (...) My wife used to run a restaurant and bring us [him and his friends] food to our hunting lodge. The only*

² The researcher who conducted the interviews is a young female therefore this result may be strongly biased. ²

contact she had with me during the season was that (...) Do you know that hunting was one of the biggest causes of divorce here?

3.4.3 Outside the community

Hunters were asked about how they dealt with being hunters outside of their community. Some of them work in Bregaglia valley and have no problem to identify themselves as hunters in their workplace or in other social spaces (Christian, Manuel, Stefano, Giovanni, and Leonardo). Others, who live or work far from the valley, recounted different experiences. Stella, for example, avoided to show this part of herself: *“I prefer not to say that I am a hunter... I live in a city [periurban area of Zurich] and (...) I’m a kindergarten teacher. (...) I do not want to face criticism. (...) It is not, like, shame, by the way”*. Diana recounts her experience as a physiotherapist who, at the time of the interview, was attending a course to becoming a yoga teacher:

“They are all vegetarians [the yoga course attendants] (...) I said, well, you're all vegetarians, I don't mind. At first, I didn't know whether to say that ... then I took the courage and said, "I am a hunter!" and they all looked at me like that [looks wide-eyed, incredulous] (...) "for me, hunting is more ethical than eating animals that are raised in one of those super modern farms with no place, where animals can't move” (...) They finally accepted what I was saying. They also became convinced that it is a little more ‘right’ thing to do. They understood my position of ‘I don't eat meat, but I understand your idea!’ So, it was a confrontation, not unpleasant, although at first, I was a little afraid to talk about it because I thought ‘I eat meat, but also I kill animals!’”

Using the meat-motivation to legitimize hunting in other social spaces different from the hunting domain (i.e., in the workplace) was also described by Daniele:

“I say that I am a hunter, of course I do (...) because I work in a male environment [Daniele is a metalworker] (...) However, there are no hunters among my colleagues (...). At first, they were against hunting but once I brought them meat, they suddenly changed their opinion (...) now they go mad for the meat of the ‘poor’ defenceless

Bambi (...) However, it was difficult to make them understand that hunting is not just killing but is living in the nature.”

4. Preliminary discussion and conclusions

Relying on our preliminary analysis of findings, some considerations can be drawn. First, data gained while investigating the ‘hunter’ in the context of the Grisons show consistency with previous literature. As shown by our findings hunters were socialized into this activity by a family member, at a young age (Bissell et al., 1998; Purdy et al., 1989; Responsive Management/National Shooting Sports Foundation, 2008). In this connection seems worth mentioning that findings from Stedman and Heberlein (2001) reported the existence of gender differences in primary socialization, emphasizing how for female hunters ‘having a father who hunts’ seems a crucial condition to get closer to this activity. Conversely, male hunters can be easier to have first contact with hunting, even fostered by sources external to their family. Next, the literature reports some differences in adult attitudes towards hunting related to rural-urban childhood community size (Wells, 2008; Wilkins et al., 2019), revealing a higher probability to become a hunter for people growing up in rural areas (Wilkins et al., 2019). In this sense, also the ‘nature’ theme, and the connection with it during childhood may play a key role in building the hunter identity. Furthermore, concerning death, as a theme discussed, our results seem in line with what was reported by Reis (2009), who described similar findings related to hunters’ feelings linked to the killing. In this connection, Kelly and Rule (2013) proposed the ‘love-killing paradox’ as a key to interpreting the oxymoron that characterizes hunters’ relationship with their prey. If, on one hand (love), hunters have an admiration and fascination -almost spiritual- for nature, on the other hand (death) they perform an extreme form of violence against it (killing). Interestingly, Kelly and Rule (2013) stressed the importance of reconfiguring hunting, which can no more be defined as just a sport (or a tradition) but must be re-defined in a different dimension, where it must assume more ethical values to become tolerable. In this regard, von Essen and

Tickle (2020) describe hunting as a 'serious leisure', an activity between a '*societal duty that delivers wildlife management*' and a 'hobby' in crisis between '*labour and leisure*'. This interpretation suggests again the importance of reconsidering the role of hunters and the necessity of gaining knowledge of hunters' identity, both within and outside their own communities. In this regard, we may argue that our preliminary results suggest the motivations for hunting (e.g., 'enjoyment of nature', 'meat procurement', 'camaraderie') and even the reported negotiations between the 'old' and 'new' school of hunters, both inside and outside of the community (*senior* men vs. *young* men and women) suggest multifaced and identity-related systems of values which expand the significance of hunting beyond 'tradition' or 'sport'.

In this sense, according to postmodernism theory, if leisure in modernism was a symbol of freedom, choice, and self-determination, conversely, under postmodernism such values are experienced by the individual in work and other areas of life (Rojek, 1997): thus, the modern scheme according to which these features were uniquely related to leisure is refuted. In this sense, leisure as a form of consumption embodies different symbols for different identities.

Even if only 'preliminarily', we can assert that hunting is adapting to the postmodern era by reconstructing itself through the figure of the hunter, gaining 'renewed' values. An important clue of this shift can be identified, for example, in the high importance given by hunters to the 'meat discourse'. Some of the hunters interviewed more sustainable way to produce meat, empathizing the role of self-sufficiency as a motivation to hunt. Moreover, 'new' hunters' identities are entering the arena: for example, the growing presence of women hunters is currently challenging a traditionally a male dominated domain.

References

- API- World Animal Protection Index [api_2020_-_switzerland.pdf](#) (worldanimalprotection.org) accessed 20/11/2022
- Arnett, E. B., & Southwick, R. (2015). Economic and social benefits of hunting in North America. *International Journal of Environmental Studies*, 72(5), 734-745.
- Basit, T. (2003). Manual or electronic? The role of coding in qualitative data analysis. *Educational Research*, 45(2), 143–154. <https://doi.org/10.1080/0013188032000133548>
- Benningstad, N. C. G., & Kunst, J. R. (2020). Dissociating meat from its animal origins: A systematic literature review. *Appetite*, 147, 104554. <https://doi.org/10.1016/j.appet.2019.104554>
- Birdsong, M., Morse, W., Steury, T., & Smith, M. (2022). Socialization and motivational pathways among different groups of non-traditional hunters in Alabama reveal unique recruitment and retention opportunities. *Human Dimensions of Wildlife*, 27(5), 407–421. <https://doi.org/10.1080/10871209.2021.1954266>
- Cerulli, T. 2012. *The mindful carnivore: a vegetarian's hunt for sustenance*. Pegasus, New York, New York, USA
- Collenberg, A. "Bregaglia, valle", in: *Dizionario storico della Svizzera (DSS)*, versione del 15.11.2005(traduzione dal tedesco). Online: <https://hls-dhs-dss.ch/it/articles/008064/2005-11-15/>, consultato il 08.7.2022.
- Cretois, B., Linnell, J. D. C., Grainger, M., Nilsen, E. B., & Rød, J. K. (2020). Hunters as citizen scientists: Contributions to biodiversity monitoring in Europe. *Global Ecology and Conservation*, 23, e01077. <https://doi.org/10.1016/j.gecco.2020.e01077>
- Demartini, D. Vecchiato, T. Tempesta, A. Gaviglio, e R. Viganò, «Consumer preferences for red deer meat: a discrete choice analysis considering attitudes towards wild game meat and hunting», *Meat Science*, vol. 146, pagg. 168–179, dic. 2018, doi:10.1016/j.meatsci.2018.07.031.
- Di Minin, E., Clements, H. S., Correia, R. A., Cortés-Capano, G., Fink, C., Haukka, A., Hausmann, A., Kulkarni, R., & Bradshaw, C. J. A. (2021). Consequences of recreational hunting for biodiversity conservation and livelihoods. *One Earth*, 4(2), 238–253. <https://doi.org/10.1016/j.oneear.2021.01.014>
- Dickson, B., Hutton, J., & Adams, W. M. (Eds.). (2009). *Recreational Hunting, Conservation and Rural Livelihoods*. Wiley-Blackwell.

<https://doi.org/10.1002/9781444303179>

Dwyer, S. C., & Buckle, J. L. (2009). The space between: On being an insider-outsider in qualitative research. *International journal of qualitative methods*, 8(1), 54-63.

Eisenhardt, K. M. (n.d.). *Building Theories from Case Study Research*. 24.

Eisenhardt, K. M., Graebner, M. E., & Sonenshein, S. (2016). Grand challenges and inductive methods: Rigor without rigor mortis. *Academy of management journal*, 59(4), 1113-1123.

Elliott, C. (Ed.). (2016). *How Canadians Communicate VI: Food Promotion, Consumption, and Controversy*. Athabasca University Press. <https://doi.org/10.15215/aupress/9781771990257.01>

Fassin, D. 2013. Why Ethnography matters: On Anthropology and Its Publics. *Cultural Anthropology*, Vol. 28, No. 4, pp. 621-646.

Ficetola, G. F., Bonardi, A., Mairota, P., Leronni, V., & Padoa-Schioppa, E. (2014). Predicting wild boar damages to croplands in a mosaic of agricultural and natural areas. *Current Zoology*, 60(2), 170–179. <https://doi.org/10.1093/czoolo/60.2.170>

Fischer, A., Kereži, V., Arroyo, B., Mateos-Delibes, M., Tadie, D., Lowassa, A., Krange, O., & Skogen, K. (2013). (De)legitimising hunting – Discourses over the morality of hunting in Europe and eastern Africa. *Land Use Policy*, 32, 261–270. <https://doi.org/10.1016/j.landusepol.2012.11.002>

Fitzgerald, A. J. (2005). The emergence of the figure of “ woman-the-hunter :” equality or complicity in oppression? *Women’s Studies Quarterly*, 33(1), 86–104.

Frant, M., Lyjak, M., Bocian, L., Barszcz, A., Niemczuk, K., & Wozniakowski, G. (2020). African swine fever virus (ASFV) in Poland: Prevalence in a wild boar population (2017–2018). *Veterinárni Medicína*, 65(No. 4), 143–158. <https://doi.org/10.17221/105/2019-VETMED>

Gerber, J.-D., Nahrath, S., Reynard, E., & Thomi, L. (n.d.). The role of common pool resource institutions in the implementation of Swiss natural resource management policy. 26.

Giacomelli, S., & Gibbert, M. (2018). “He likes playing the hero – I let her have fun shooting”. Gender games in the Italian forest during the hunting season. *Journal of Rural Studies*, 62, 164–173. <https://doi.org/10.1016/j.jrurstud.2018.08.005>

Gibbert, M., & Ruigrok, W. (2010). The ““What”” and ““How”” of Case Study Rigor: Three Strategies Based on Published Work. *Organizational Research Methods*, 13(4), 710–737. <https://doi.org/10.1177/1094428109351319>

- Gibbert, M., Ruigrok, W., & Wicki, B. (2008). What passes as a rigorous case study? *Strategic Management Journal*, 29(13), 1465–1474. <https://doi.org/10.1002/smj.722>
- Gigliotti, L. M., & Metcalf, E. C. (2016). Motivations of Female Black Hills Deer Hunters. *Human Dimensions of Wildlife*, 21(4), 371–378. <https://doi.org/10.1080/10871209.2016.1157714>
- Hampton, J. O., & Teh-White, K. (2019). Animal welfare, social license, and wildlife use industries: Social License and Animal Welfare. *The Journal of Wildlife Management*, 83(1), 12–21. <https://doi.org/10.1002/jwmg.21571>
- Heberlein, T. A., Serup, B., & Ericsson, G. (2008). Female Hunting Participation in North America and Europe. *Human Dimensions of Wildlife*, 13(6), 443–458. <https://doi.org/10.1080/10871200802294265>
- Heffelfinger, J. R., Geist, V., & Wishart, W. (2013). The role of hunting in North American wildlife conservation. *International Journal of Environmental Studies*, 70(3), 399–413. <https://doi.org/10.1080/00207233.2013.800383>
- <https://www.jagdstatistik.ch/de/home> accessed 20/11/2022
- Jeanes, R. (2011). ‘I’m into high heels and make up but I still love football’: exploring gender identity and football participation with preadolescent girls. *Soccer & Society*, 12(3), 402–420.
- Kelly, J. R., & Rule, S. (2013). The hunt as love and kill: hunter-prey relations in the discourse of contemporary hunting magazines. *Nature and Culture*, 8(2), 185–204.
- Legge cantonale sulla caccia * (LCC) del 4 giugno 1989 (stato 1 luglio 2019) accettata dal Popolo il 4 giugno 1989
- Lindemann, D. J., Doggett, A., & Getsis, S. (2022). Hunting in a Hostile Climate?: Hegemonic Masculinity and Emphasized Femininity on a Hunting Message Board. *Men and Masculinities*, 25(4), 602–621. <https://doi.org/10.1177/1097184X211065022>
- Lindgreen, A., Di Benedetto, C. A., & Beverland, M. B. (2021). How to write up case-study methodology sections. *Industrial Marketing Management*, 96, A7–A10. <https://doi.org/10.1016/j.indmarman.2020.04.012>
- Marescotti E., V. Caputo, E. Demartini, e A. Gaviglio, «Discovering market segments for hunted wild game meat», *Meat Science*, vol. 149, pagg. 163–176, mar. 2019, doi: 10.1016/j.meatsci.2018.11.019.
- Massei, G., Kindberg, J., Licoppe, A., Gačić, D., Šprem, N., Kamler, J., Baubet, E., Hohmann, U., Monaco, A., Ozoliņš, J., Cellina, S., Podgórski, T., Fonseca, C., Markov, N., Pokorny, B., Rosell, C., & Náhlik, A. (2015). Wild boar populations up,

numbers of hunters down? A review of trends and implications for Europe: wild boar and hunter trends in Europe. *Pest Management Science*, 71(4), 492–500. <https://doi.org/10.1002/ps.3965>

Mattimoe, R., Hayden, M. T., Murphy, B., & Ballantine, J. (n.d.). *Approaches to Analysis of Qualitative Research Data: A Reflection on the Manual and Technological Approaches*. 15.

Meredith, J. (1998). Building operations management theory through case and field research. *Journal of Operations Management*, 16(4), 441–454. [https://doi.org/10.1016/S0272-6963\(98\)00023-0](https://doi.org/10.1016/S0272-6963(98)00023-0)

Metcalf, E. C., Graefe, A. R., Trauntvein, N. E., & Burns, R. C. (2015). Understanding Hunting Constraints and Negotiation Strategies: A Typology of Female Hunters. *Human Dimensions of Wildlife*, 20(1), 30–46. <https://doi.org/10.1080/10871209.2015.957366>

Moran, R. L. (2012). *Dona Brown, Back to the Land: The Enduring Dream of Self-Sufficiency in Modern America* (Madison: University of Wisconsin Press, 2011, \$24.95 paper, \$12.95 e-book). Pp. 290. isbn 978 0 2992 5074 4. *Journal of American Studies*, 46(2), E40. <https://doi.org/10.1017/S0021875812000679>

Morelle, K., Lehaire, F., & Lejeune, P. (2013). Spatio-temporal patterns of wildlife-vehicle collisions in a region with a high-density road network. *Nature Conservation*, 5, 53–73. <https://doi.org/10.3897/natureconservation.5.4634>

Peterson, H. H., Taylor, M. R., & Baudouin, Q. (2015). Preferences of locavores favoring community supported agriculture in the United States and France. *Ecological Economics*, 119, 64–73. <https://doi.org/10.1016/j.ecolecon.2015.07.013>

Pollan, M. 2006. *The omnivore's dilemma*. Penguin, New York, New York, USA.

Quartuch, M. R., Stedman, R. C., Decker, D. J., Larson, L. R., Siemer, W. F., & Baumer, M. S. (2017). Exploring Nontraditional Pathways Into Hunting in New York State: Implications for Recruitment and Retention. *Human Dimensions of Wildlife*, 22(5), 391–405. <https://doi.org/10.1080/10871209.2017.1334247>

Quirós-Fernández, F., Marcos, J., Acevedo, P., & Gortázar, C. (2017). Hunters serving the ecosystem: The contribution of recreational hunting to wild boar population control. *European Journal of Wildlife Research*, 63(3), 57. <https://doi.org/10.1007/s10344-017-1107-4>

Reinhold Kaiser; Werner Meyer; Martin Bundi; Peter Bollier; Max Hilfiker; Silvio Färber; Ulrich Pfister; Adolf Collenberg; Marc Antoni Nay; Philipp von Cranach; Georg Jäger; Jürg Simonett: "Grigioni", in: *Dizionario storico della Svizzera (DSS)*,

versione del 11.01.2018(traduzione dal tedesco). Online: <https://hls-dhs-dss.ch/it/articles/007391/2018-01-11/>, consultato il 29.8.2022.

Reis, A. C. (2009). More than the kill: Hunters' relationships with landscape and prey. *Current Issues in Tourism*, 12(5–6), 573–587. <https://doi.org/10.1080/13683500903042881>

Rodriguez, S. L. (2016). Gender differences in hunter recruitment and dedication in Denmark. *Wildlife Biology in Practice*, 12(2), 301. <https://doi.org/10.2461/wbp.2016.12.5>

Rojek, C. (1997). Leisure theory: Retrospect and prospect. *Loisir et société/Society and Leisure*, 20(2), 383-400.

Smith, A. P., Metcalf, E. C., Nesbitt, H. K., Leonard, H. J., Cummins, T. M., Metcalf, A. L., & Graefe, A. R. (2022). Confidence, community & conservation: Exploring the relationship between self-efficacy and experience in female hunters. *Journal of Outdoor Recreation and Tourism*, 40, 100568. <https://doi.org/10.1016/j.jort.2022.100568>

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks: Sage Publications, Thousand Oaks (1995)

Stedman, R. C., Larson, L. R., Tidball, K. G., Tidball, M., & Curtis, P. D. (2017). Hunting and the local food movement: Insights from central New York State. *Wildlife Society Bulletin*, 41(4), 720–728. <https://doi.org/10.1002/wsb.802>

von Essen, E., & Tickle, L. (2020). Leisure or labour: an identity crisis for modern hunting?. *Sociologia Ruralis*, 60(1), 174-197.

Wells, N. M. (n.d.). *Nature and the Life Course*:

Wilkins, E. J., Cole, N. W., Miller, H. M., Schuster, R. M., Dayer, A. A., Duberstein, J. N., Fulton, D. C., Harshaw, Howard. W., & Raedeke, A. H. (2019). Rural-urban differences in hunting and birdwatching attitudes and participation intent. *Human Dimensions of Wildlife*, 24(6), 530–547. <https://doi.org/10.1080/10871209.2019.1661046>

Wollan, Malia. 2022. 'An Environmentalist With a Gun': Inside Steven Rinella's Hunting Empire. *New York Times* <<https://www.nytimes.com/2022/02/02/magazine/meateater-netflix-steve-rinella.html>> [Last access 16.12.2022]

Yin, R. *Case study research and applications design and methods* (6th ed.), Sage Publications, Thousand Oaks (2018)

CHAPTER V

Conclusions

Recently hunting has gained attention in the scientific literature, and different research domains are exploring its features and its role in the contemporary era. Interestingly, when hunting is considered as an alternative production method, it seems to acquire positive attributes. Recreational hunters are also claimed to serve wildlife management, and hunting has a role not only for pests' control, but also related to (overabundant) species management. Conversely, it cannot be denied that hunting legitimacy is still debated: does it still makes sense in the third millennium to kill animals for recreational purposes?

As anticipated in the Introduction section, the first object of investigation in this thesis was related to the 'good side' of hunting. According with the previous literature on the topic, we hypothesized that western consumers might be interested in hunted wild game meat (HWGM), appreciating it for its characteristics. HWGM is a healthy and more environmentally sustainable alternative then meat deriving from farmed animals. From an ethical perspective, it can be also labelled as more 'animal welfare friendly' since it derives from wild animals that living their existences according to their needs. With the final aim of gaining knowledge of this topic, the first study, aimed at reviewing the literature related to consumers' perception towards HWGM (Chapter II), revealed that HWGM is perceived generically positively by Western consumers, even if some areas of concern can be highlighted. Within the categories of variables identified linked to HWGM perceptions, namely sociodemographic variables, product-related variables and supply-chain related variables, variables that most correlate with the positive perception of HWGM are gender (being male) and residence (living in a rural area). Showing positive attitudes toward hunting and having familiarity with hunting also play crucial role in defining

consumers' positive attitude towards HWGM. On the contrary, the major consumers' concern is related to HWGM food safety since literature analysis have revealed that consumers do not trust hunting abilities in performing HWGM handling. Hunters are not professional food handlers, but they are allowed -at least in Europe- to sell their meat, not only on a local scale, but also to place it on the market for large scale commercialization (Reg. EC No. 853/04). According to European regulation on food safety, hunters are *fully-fledged* primary food producers. Consumer's concerns toward hunters as 'meat producer' seems plausible: the Western hunter is portrayed as an enthusiastic hobbyist in the popular imagination and its public role as food producer is recently emerged.

To reveal whether consumers' mistrust in hunter abilities was reasonable, the existence of Optimistic bias (OB) in a sample of Italian hunters has been assessed in a second study (Chapter III). The OB, also called '*unrealistic optimism*', is a cognitive bias defined as "*a positive outlook regarding future events, in which individuals find themselves less likely than others to experience negative events*" (Weinstein, N. D, 1984; S. O. Gouveia, V. Clarke, 2001). Taking a cue from the work of Da Cunha et al., 2014, which assessed the presence of OB in food handlers demonstrating how discovering its presence might lead to an increase in the risk of food-borne diseases among consumers, due to possible negligence in implementing food-safety-related practices, we hypothesized that a biased hunters could overlook some protection attitudes and *-unintentionally-* contaminate HWGM. Unfortunately, our findings revealed the presence of OB in Italian hunters, emphasizing that this category of idiosyncratic food producer, directly responsible for HWGM safety, appears to underestimate their role as food handlers. This result stresses the importance of the need of future reinforcements of hunter training, even with the purposes of creating a supply-chain for HWGM commercialization, in contexts like Italy, where the distribution of this product is not currently organized.

Next, given the results obtained in Chapter II and III, is it possible to highlight somewhat a contradiction: hunters do not define themselves as 'producer', even if

simultaneously the HWGM is appreciated by consumers who in the future could search as an alternative product to farmed meat. As suggested by philosophical literature, hunter is accepted by the general public (consumers) only if he/she produce meat but is more often condemned. From this perspective, HWGM can operate as a mean to enhance recreational hunting acceptance by the general public, and therefore of legitimizing the existence of this activity. Indeed, if hunters want to continue hunting, they must find new identities by re-framing their role into the postmodern society. For the hunter, perpetuate the claim that hunting is ‘part of tradition’ is no longer enough to maintain the ‘social license’.

The third study (Chapter IV) aimed to reveal how hunters are reforming their identity, inside and outside the hunting community. An exploratory case study on the Swiss canton of Grisons, allowed us to obtain findings to re-think and reformulate the hunter role, from a postmodern perspective. We found that the new generation of hunters, are leisure consumers who attribute, depending on their identity, a specific meaning to hunting, renegotiating their renewed identity outside (and the inside) the hunting community.

The results of the three studies here offered can be useful in different applications. First, understanding how consumers perceive HWGM may contribute to the creation of targeted policies and marketing strategies aimed at enhancing the perceived value of HWGM. Second, discovering the presence of OB related to risk perception in hunters suggested that procedures to ensure food safety of HWGM need to be implemented (i.e., specific, and more targeted training strategies for hunters, adequate protocols to ensure proper hunters’ behaviour). Finally, investigating changes in hunters' identities and reconfiguring them into the post-modern perspective represent not only a theoretical exercise, but contribute to sociological literature also implying the concrete chance of understanding which *new* hunters’ identities need to be considered during the creation of targeted hunters recruitment strategies.

