The Hole in the ORAM:

Going Back to the ABC's of Hunting and Fishing

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This project was successful largely due to the efforts of:

Justin Grider	Alabama Department of Conservation and Natural Resources
Aaron Hershberger	Nebraska Game and Parks Commission
Jeff Rawlinson	Nebraska Game and Parks Commission
KC Mote	Tennessee Wildlife Federation
Matt Bartley	Utah Division of Wildlife Resources
Kaylee Mortensen	Utah Division of Wildlife Resources

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EXECUTIVE SUMMARY

Recruitment, retention, and reactivation efforts are designed, in part, to thwart the looming decline of outdoor recreationists. The Outdoor Recreation Adoption Model (ORAM) (Byrne and Dunfee, 2018) has been an integral theory to unify myriad R3 efforts conducted by state fish and wildlife agencies (SFWAs), conservation NGOs, and outdoor industries as it focuses effort design and strategy on the development process of a hunter. Though foundational to modern R3 theory, the ORAM does not provide an R3 practitioner with sufficient information to identify where, specifically, an individual is positioned in their journey to accepting hunting as an activity that aligns with their identity. This study's purpose is to augment the ORAM by clarifying the 'Self-Identification' portion of the model; that is, the process by which a person progresses from only *participating* in hunting, to *identifying* as a hunter.

To complete this work, the Wildlife Management Institute partnered with four collaborating state organizations to measure three proposed elements of self-identification as a hunter – Aptitude, Behavior, and Community (ABCs), on pre- and post-R3 event surveys. We conducted extensive cognitive testing to ensure the 10-question battery (a group of survey questions designed to measure an idea) accurately measured hunter identity ($\alpha_{Aptitude} = 0.92$, $\alpha_{Behavior} = 0.89$, $\alpha_{Community} = 0.90$), to ensure that the final survey instrument can be utilized nationwide to link participants with the R3 events that will be most beneficial to them in their particular stage of recreation adoption. This battery can be used either to help agency staff to direct a constituent to an appropriate R3 experience or as a pre- and post-R3 event survey. Using the ABC identity factors, and an individual's relative strengths and weaknesses within those factors, we created a potential typology of eight types of hunters. These eight typologies will allow SFWAs to utilize a common vocabulary when discussing the most needed R3 experiences within certain types of hunters.

We used the ABCs measurements from the pre-R3 event surveys to ascertain the type of hunter attracted to specific types of R3 events. Results indicated that, overall, R3 events analyzed in this research were attracting new to moderately new hunters. As expected, R3 events that taught more advanced techniques or used more advanced methods attracted more experienced hunters. SFWAs that intentionally marketed to adults were successful in registering older attendees.

To determine the effectiveness of R3 events at developing hunter identity, we used the difference of the ABCs between the pre- and post-event surveys. We found, in general, that R3 events are effective at lifting the ABC identity factors of those who attended, in statistically significant ways. Specific events differed in the magnitude of that lift. Virtual workshops were effective at lifting Aptitude due to their nature as an educational experience, though there were also small increases in Behavior and Community factors.

Finally, we worked with collaborating state organizations to rate R3 events in terms of how much they would lift each of the separate ABC identity components (i.e. if they are low, medium, or high at lifting an individual's Aptitude, Behavior and/or Community) within

participants. When all SFWA R3 events, and their ABC rankings, are listed in aggregate, it creates a strategic orientation matrix. This orientation matrix is a useful communication tool to encourage constituents to create their own, tailored roadmap of R3 efforts, with clear 'next steps' to propel attendees to a 'decision to continue' in hunting and angling. As SFWAs continue to increase their efforts to recruit, retain, and reactivate hunters, they should consider including ABC identify formation theory in their application of the ORAM.

BACKGROUND

Recent longitudinal studies (Chase, 2011; Chase 2018; Chase & Dunfee, 2022) have marked a change in the nation's conception of R3 and why the strategic use of accurate data is essential to the survival of North America's hunting traditions and wildlife management institutions. A clear takeaway from this research is that the portion of Americans who hunt and fish is diminishing. As the number of these outdoor recreationists wane, so too does the political influence and operational relevance of SFWAs. It is for this cause that SFWAs and other R3-vested organizations and industries began re-doubling their efforts to restore their participant base through events designed to recruit new hunters, retain active hunters, and reactivate lapsed hunters (R3).

The early days of R3 were understandably disjointed. In some states, there was very little coordination between SFWAs or even between NGO-sponsored events within the same state. This scattered approach led to some antipathy or outright dismissal of efforts designed to measure the efficacy of R3 efforts. SFWAs motivations for conducting R3 efforts has broadened over the years, and many state agencies and NGOs have become far more scientific in their approach to R3. A fundamental cognitive model that has served as a theoretical backbone for this advancement in R3 is the Outdoor Recreation Adoption Model (Byrne & Dunfee, 2018).

This study aims to further understand the identity formation stage of the Outdoor Recreation Adoption Model. We established the use of three identity factors, Aptitude, Behavior, and Community, for use in assessing individuals participating in R3 events. We contend that the ABC identity factors can be used 1) to assess hunter identity formation at the **individual level**, to assist constituents in understanding their hunter type, 2) to assess R3 efforts at the **event level**, to ascertain the efficacy of the event, and 3) to assess hunter identity formation and R3 efforts at the **program level**, as SFWAs can combine the individual's ABC results and R3 events' strengths, in terms of ABCs, to clearly identify which R3 events would be beneficial 'next steps' to hunter identity development.

Outdoor Recreation Adoption Model

The Outdoor Recreation Adoption Model (ORAM) has been a primary theoretical construct for R3 efforts for over a decade. Based in Diffusion of Innovation Theory (Rogers, 1962), the ORAM has experienced success in changing the hearts and minds of R3 decision makers and practitioners alike to embrace outcome-based strategies and evaluations in the application of R3. Its use as everything from a thought experiment to a foundation for an organization's strategic plan is nearly ubiquitous within the modern R3 Community of practice. Though the ORAM has proven useful, few of those who tout its merits fully understand the elements of its logic that need further study before being put into practice.

Over time, feedback from users of the suite of evaluation resources rooted in ORAM theory, and the attendees of associated trainings, have illuminated the primary blind spot in the ORAM's applicability in guiding an R3 professional's evaluation and decision-making processes: the "decision to continue," its direct association with individual identity formation, and the critical role it plays in a person's ultimate Behaviors in the future. The original ORAM thesis noted the ambiguity of this process by stating, "the 'decision to continue' step actually occurs, in some degree, at all stages of the adoption model and may occur multiple times between stages" (Byrne & Dunfee, 2018). This thesis also recognized that "the decision to continue following the personal experience of a first trial (or trials) is likely heavily influenced by the formation of an individual's self-identification as a hunter" (Byrne & Dunfee, 2018).

The decision to continue "delineating" a participant's need for "different efforts or interventions" is precisely where the ORAM may be deficient in providing answers to a modern R3 practitioner's assessment. Specifically, it is unclear of how to direct a hunter on "what to do next" (fig. 1). Similarly, it is unclear what specific aspects of the R3 effort changed/motivated the participant to go hunting or fishing. Further, while current evaluation assessment tools (surveys, questionnaires, etc.) can help identify a participant's self-reported likelihood of future participation, and their general satisfaction with the R3 effort in question, they do not provide data capable of relaying exactly what kind of R3 engagement the participant needs next, in exactly what way. This void in modern R3 evaluation technique has unintentionally halted many R3 practitioners from identifying how to design efficient pathways for various target demographics and has left them unsure as to how the identify formation of a participant can be accelerated to convert them into an avid and independent hunter, angler, or recreational shooter. This study is an attempt to ameliorate this weakness in the ORAM by building on the self-identity component of the model, specifically through the development of

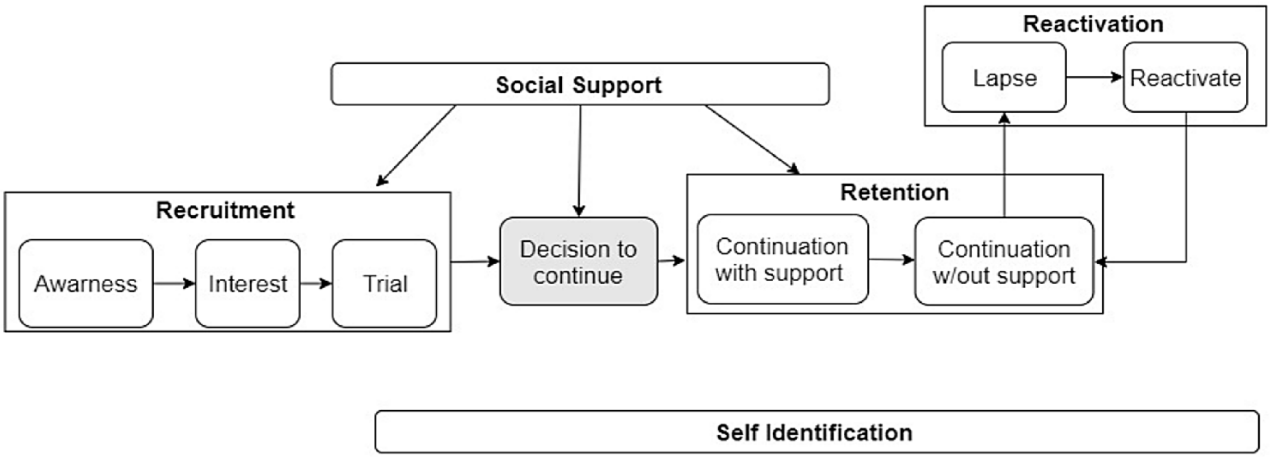


Figure 1. The Outdoor Recreation Adoption Model (ORAM) as presented by Byrne and Dunfee, 2018. Note the Self Identification element that pervades the process after the 'Decision to Continue' phase, but may not have been fully understood or taken advantage of by R3 practitioners.

three major components to self-identity, as measured before and after specific R3 events within four collaborating states.

The Hole in the ORAM: Self Identification

The process of establishing a self-identity, its role in the decision to continue, and the ways in which it can be accelerated are well known to social science. In early foundational works, Durkheim (1912), the founder of modern sociology, noted the linkages between defining oneself through defining one's Community. Importantly, the process of identity formation is defined by the collective consciousness of the groups to which an individual belongs. Later, Marcia (1966), Erikson (1968), and others further developed Self-Identity Theory by expanding the definition of self to be assisted by not just the groups to which the individual belongs, but also to the groups the individual does not belong.

For the purposes of this study, **Identity** is defined as the set of characteristics, values, appearance, or expressions that characterize a person or a group (Harter, 2012). Erikson's work on identity (1959) is instructive as it delineates where individuals at different phases of life are struggling to form their identity in different ways. Erikson identifies eight stages of psychosocial development, each with different goals. These stages have ramifications to identity formation; for example, an adolescent has goal orientations very different from a middle-aged adult. As such, the method of recruitment to hunting should be approached differently for different phases of life and their associated goal orientations. For example, a young adolescent might hunt simply due to the fact that one of their parents also hunts. However, a later adolescent would likely need to justify hunting not only in the context of their family of origin, but also in the context of what hunting would do to their perception amongst their peers. Further, an early adult may adopt hunting to be a part of a community and peer-bond, whereas an older adult may be seeking an activity in which they can meaningfully bond with their partner and/or children.

Building on Erikson's life work, Marcia (1966) posited another identity paradigm focusing on the concepts of *exploration* and *commitment*. Marcia hypothesized an individual's identity is established by the extent that a person has explored different components of identities, and then the level of commitment to a particular identity. In the context of hunting, a youth may be committed to hunting as a result of hunting with a parent, yet they may not have explored other activities they might also enjoy (a state of low *exploration* but high *commitment* that Marcia termed "identity foreclosure"). Conversely, a youth may experiment with many hobbies to identify which match their personality, but may not be deeply committed to hunting (a state of high *exploration* but low *commitment* termed "identity moratorium"). In either of these scenarios, the likelihood of the youth continuing hunting as an adult is lower because the individual either finds a surrogate activity, or the individual realizes their commitment to

hunting was more about the allegiance to loved ones rather than dedication to the activity. On the other hand, if an individual explores myriad hobbies, and subsequently elects hunting as their activity of choice, the likelihood of them hunting well into the future is highly likely (a state of high on both *exploration* and *commitment* termed "identity achievement").

The concept of identity formation as a prerequisite to continued membership in a Community is well established in the literature of other study domains (Marcia 1966; Erikson, 1968) and applies exceptionally well to the linkage between identifying oneself as an outdoor recreationist and subsequent continuation in participation (Byrne & Dunfee, 2018; Purdy, Decker, & Brown, 1985; Decker & Purdy, 1986; Purdy, Decker, & Brown, 1989; Wentz & Seng, 2000; Larson et al., 2013). Regrettably, this self-identity research has yet to infiltrate into the practice of R3 evaluation or program development, particularly given the established importance of self-identification already extant in the ORAM. In fact, it could be argued that identity formation is the most determinative factor in the process of recruiting, retaining, or reactivating an outdoor recreationist.

Table 1. Erickson's eight life stages and their corresponding identity development. Adapted from Erikson's Identity and the Life Cycle (1959).

Stage (age)	Psychosocial crisis	Important relationships	Existential Question
I Infant	trust v. mistrust	Mother	Can I trust the world?
II Toddler	autonomy v. shame and doubt	Parents	Is it okay to be me?
III Preschooler	initiative v. guilt	family unit	Is it okay for me to act independently?
IV School-age child (7-11)	industry v. inferiority	neighborhood, school	Can I successfully navigate the world of people and things?
V Adolescence (12-19)	ego-identity v. role-confusion	peer groups, role models	Out of all the possible versions of me, which one do I choose to be?
VI Early adult	intimacy v. isolation	mates, friends	Can I unite myself with another person?
VII Middle adult (40-60)	generativity v. self-absorption	mate, children, colleagues	Can I make my life count?
VIII Late adult (60+)	integrity v. despair	humankind	Did my life matter and what will remain after I am gone?

Identity Formation as a Hunter

Regardless of the identity literature tradition used, modern social science theories of identity formation generally include three influential factors. Specifically, when Marshall (2002) was studying rituals within societies, he ascertained that identity has a *belief*, a *Behavioral*, and a *belonging* component. The belief component has a cognitive and affective side, such that an individual must think and feel a ritual contains meaning (Grim & Grim, 2019). The Behavior component consists of outward actions that symbolizes to others in society that they are part of the group, sometimes manifesting as initiation rites (Aronson & Mills, 1959). The rites the individual participates in, and observes others doing, contribute to group cohesion and belonging (Ashforth, Harrison, & Corley, 2008; Mael & Ashforth, 1992; Hagerty et al., 1992; Knekta, 2020). More recently, the belief, Behavior, belonging paradigm has been applied to wide ranging fields such as organizational management, sociology, modern faith traditions, and psychology (O'Reilly & Chatman, 1986; Davern et al., 2024; Ansolabehere & Rivers, 2013; Krosnick & Abelson, 1992).

Taking these general concepts and applying them specifically to developing an identity as a hunter, we propose three analogous factors of identity formation. When applied to an outdoor recreation context, the **identity factors** are:

APTITUDE This factor includes holding favorable cognitive attitudes and emotional affect toward hunting. This factor is exemplified by an individual possessing abundant motivation, knowledge, skills, and abilities to overcome barriers that may prevent others from hunting.

BEHAVIOR This factor includes participation in, preparation/practice for, and reading/learning about hunting. This factor also includes passing along acquired information to peer-hunters as well as mentoring younger or less tenured hunters. This factor is epitomized by frequent/regular hunting of broad quarry, using various types of equipment to harvest game, and the pursuit of hunting in many geographic locales.

COMMUNITY This factor includes networking with other hunters, membership in groups with hunting interests, and having hunting partners (and/or family members) who hunt. This factor is typified by a hunter who has a robust social support structure of many hunting partners, who generally seeks out more hunter associates, and participates in the broader hunting Community.

Defining the identity of an individual is difficult and has been an ongoing debate in the larger body of social science. However, within a highly specified identity domain, such as identifying as a hunter, we suggest identity may be illustrated using the Aptitude, Behavior, and Community (ABC) identity factors. Although presented as separate, these three factors overlap and are mutually reinforcing. For example, skills and abilities (Aptitude) enable more frequent participation and a broader degree of species pursued (Behavior), and the more someone participates (Behavior), the more practical skillsets they are developing (Aptitude). Aptitude allows one to pass information and skills to others, building the outdoor recreationist Community. In reciprocal fashion, the Community passes geographically-unique information to broaden the hunter's Aptitude. Finally, an extensive Community facilitates wider and more frequent hunting Behaviors, and Behavior identifies one's standing to other members of the Community.

As these three factors overlap and work together to mutually reinforce identify formation, they can be placed in a visual radar graph (a two-dimensional representation of three or more variables that interact with each other) Each identity factor can be displayed on its own axis, labeled as A, B, or C, separated by 120°, as depicted below (fig. 2). The possible extent of the three factors is represented by the lightly shaded triangle, and the actual value of each factor is represented by the distance the darker vertices are from the center. For example, in figure 2, the selected individual is very high on Behavior and very low on Community, and the vertices are far and near the center, respectively. In general terms, the farther the vertices are from the center, the more robustly the individual identifies as a hunter and the more resilient they are to future barriers to hunting.

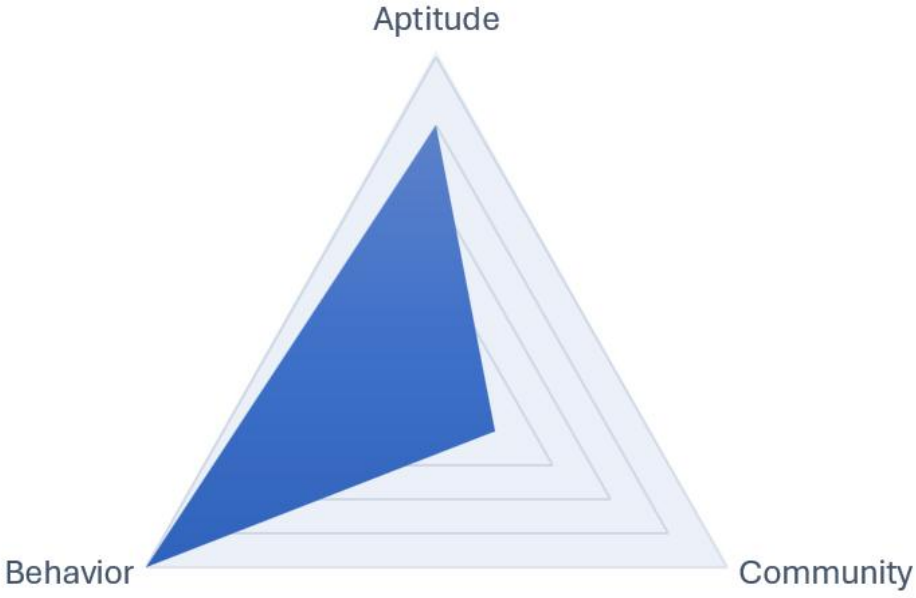
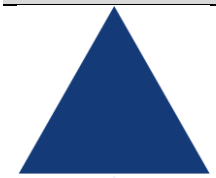


Figure 2. A radar graph depicting an individual who is moderately high on Aptitude (4 out of 5), very high on Behavior (5 out of 5), and very low on Community (1 out of 5) factors associated with identity formation. This particular graph may represent someone well integrated into hunting, but who lost much of their hunting Community by moving to a new state.

Hunter Typology

Broadly, these three ABC identity factors can be used to create a rough typology of eight hunter types (table 2). An individual who has solidified their identity as a hunter, and is high on all three factors, is represented by a larger, roughly equilateral triangle (**All-in** hunter type). There are three hunter types that are high on two factors, but relatively lower the other factor, represented by roughly obtuse triangles (**Associate of a hunter, Lapsed,** and **Recently relocated** hunter types, lower on Aptitude, Behavior, and Community, respectively). There are three hunter types that are high on one factor and relatively low the other two identity factors, represented by smaller acute triangles (**Long-lapsed**, **Tenuous**, and **Affiliate** hunter types, who are relatively higher on Aptitude, Behavior, and Community, respectively). Finally, the last hunter type is low on all three identity factors, represented by smaller, roughly equilateral triangles (**Beginner** hunter type).

Table 2. Hunter typology of eight different hunter types, including a visual of the hunter type, a proposed label to assist understanding of the hunter type, a brief classification of identity factors, and a potential description of the hunter type.

Visual	Proposed Label	Identity Factors	Description of Hunter Type
	**All-in**	High on all factors	This hunter type participates and advocates in the Community. This type is clearly in the 'continuation without support' phase, but still may be seeking to learn new techniques, quarry, or equipment.
	**Associate of a hunter**	Lower on Aptitude only	This type's participation is influenced by others, and they connect to the hunting Community, possibly before trying hunting. This type is often a partner or child of an active hunter.
	**Lapsed**	Lower on Behavior only	This type has high hunting Aptitude and has many hunting associates. Perhaps they have found a surrogate activity to replace hunting, or have aged-out of hunting.
	**Recently relocated**	Lower on Community only	This type includes individuals who are 'lone wolves' who hunt, but do not engage with the Community. This group may contain hunters who have moved and lost their connection to Community.
	**Long-lapsed**	Higher on Aptitude only	This type is knowledgeable, but they have not hunted in a long time and may have lost their connection to the Community. This group may be lapsed lone wolves.
	**Tenuous**	Higher on Behavior only	This type has fewer skills and abilities and limited social support. They are tenuous in that if hunting grounds or quarry is no longer convenient, they may cease to hunt.
	**Affiliate**	Higher on Community only	This type likely contains hunter affiliates or hunters who no longer have physicality to hunt. They may hunt little or participate as the "Camp Cook".
	**Beginner**	Low on all factors	This type is just coming into an awareness of hunting, and thus have deficits in all three factors. Historically, this type is often targeted to attend R3 efforts.

METHODS

Construct Validation

Because the Aptitude, Behavior, and Community factors of identity formation have never been applied to outdoor recreation, significant cognitive testing and construct validation were necessary for reliable research findings. We conducted a thorough literature review regarding personal identity formation from the research tradition of Durkheim (1912) and later Marcia and Erikson (1966, 1968, respectively). We found extensive identity formation research in the fields of culture, politics, religion, medicine, workplace engagement, nursing, academic affiliation, and substance abuse rehabilitation. From that body of work, we were able to adapt previously used measurement instruments to the field of outdoor recreation, specifically hunting. We initially created 14, 13, and 17 survey questions that were candidate items for inclusion in the Aptitude, Behavior, and Community constructs, respectively. We used expert opinion from four experienced researchers from the Community of practice to narrow the candidate survey response items to five (Aptitude), four (Behavior), and five (Community) questions to pretest (see table 3).

Because our interest was in the psychometric performance of the survey items, and not the ability to extrapolate to a known population, we purchased a survey population sample from SurveyMonkey's nationally-representative panel. The pretest survey asked participants about current and past involvement in several outdoor activities (in an effort to obfuscate the survey topic), excluded 'professional survey takers', and focused on those that had an affiliation with hunting. Quality control and quality assurance processes eliminated a limited number of straight-liners, speeders, and other non-reliable responses. In the sample, 46% of respondents had hunted within the last five years, 23% had hunted between five and ten years ago, and the remainder had hunted more than ten years ago. Those who had never hunted were dismissed from the survey before they could answer questions associated with the ABC identity factors. The sample was representative by sex (52% male) and age (7% *18-29*, 27% *30-44*, 48% *45-60*, 18% *over 60*). Respondents were from all regions of the United States, with the mid-Atlantic being slightly over represented. Household incomes ranged between '*< $10,000*' to '*over $200,000*', with about half under $75,000 per year (fig. 3).

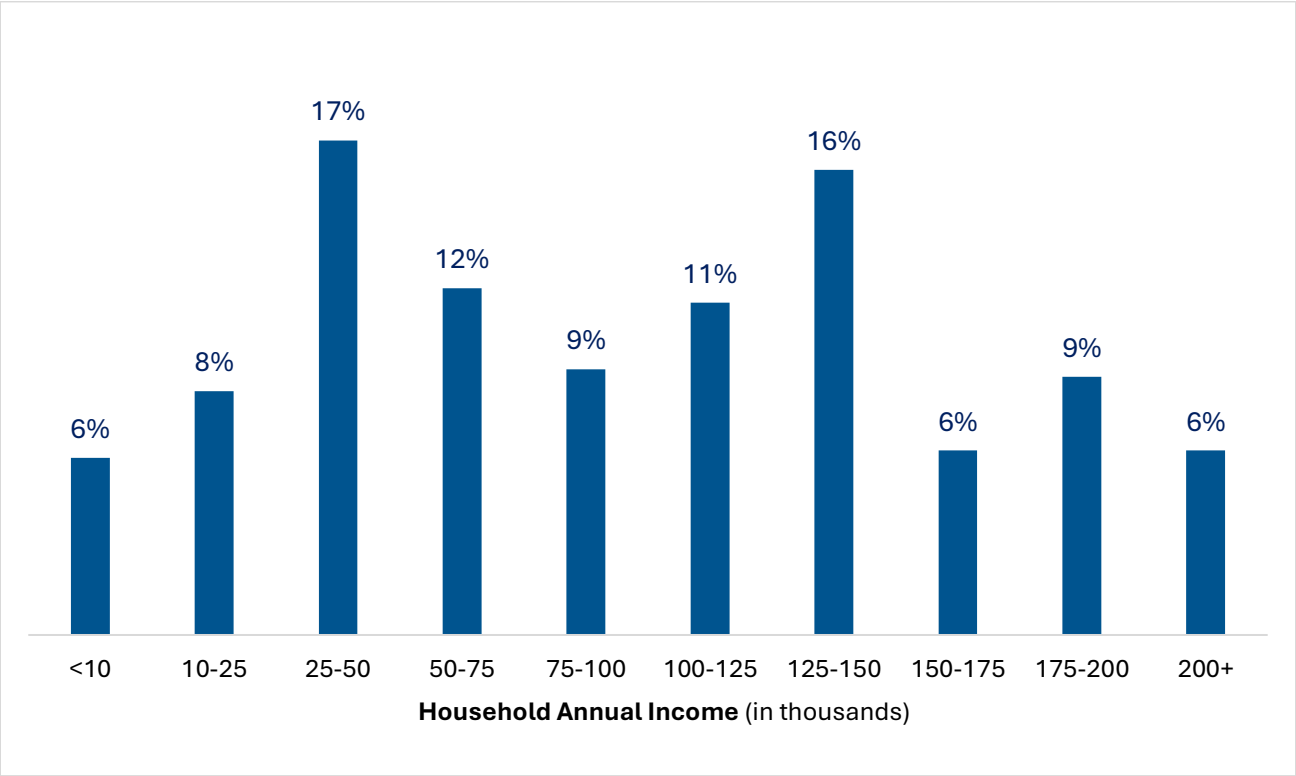


Figure 3. Income distribution of pretesting sample.

Table 3. Psychometric analysis of the three constructs of identity formation. Questions that were included appear in black, and questions that were ultimately discarded are in grey.

	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Aptitude (α = 0.92)			
Hunting is an important part of my identity.	0.880	0.787	0.921
I feel like I have the hunting skills that I need.	0.847	0.719	0.928
I prioritize hunting over other activities.	0.837	0.729	0.930
I would be very disappointed if I couldn't hunt anymore.	0.809	0.665	0.935
I talk about hunting with friends and/or family.	0.844	0.717	0.929
Behavior (α = 0.89)			
In five years, hunting will likely be one of my most important activities.	0.828	0.695	0.894
I wear clothing or display logos that show my interest in hunting (such as camo gear, hunting logos, hunting groups, etc.).	0.814	0.668	0.898
I regularly read or consume media related to hunting (such as magazines, books, internet, podcasts, YouTube, TikTok, etc.).	0.801	0.647	0.903
I would go hunting, even if I had to go by myself sometimes.	0.826	0.689	0.894
Community (α = 0.90)			
I participate in online or social media communities related to hunting.	0.860	0.760	0.919
I feel like I am part of a hunting Community.	0.847	0.731	0.921
I have people in my life that I can go hunting with.	0.803	0.657	0.927
My friends and family approve of me hunting.	0.784	0.665	0.929
I am a part of formal or informal hunting groups or organizations.	0.781	0.654	0.930
I would be willing to take a friend hunting.	0.810	0.674	0.926

In table 3, the psychometric analysis of the pretest of the Aptitude, Behavior, and Community constructs of identity formation are presented. In lay terms, the Corrected Item Total Correlation can be thought of as the correlation of the response to each individual question to the sum of the remaining questions. When this value drops below 0.40, psychometricians consider dropping or replacing the question for another question that better represents the constructs. The Squared Multiple Correlation is a measure for how well the remainder of the scale questions predict the response to the question of interest. There are no specific cut-off values for this measure; however, this study's authors begin to consider better questions

when the values drop below 0.50. The last column is Cronbach's Alpha if Item Deleted, which is the scale's reliability performance if each item is dropped from the scale iteratively. Generally, Cronbach's Alphas that are greater than 0.65 are considered reliable, however there are not specific rules for inclusion or exclusion of a question on a construct, as in some studies the applications require brevity of scales, the measurement has lower stakes, or the construct is already highly reliable (Cronbach's alpha [α] is greater than 0.90).

For the Aptitude construct (α = 0.92), the 'I would be very disappointed if I couldn't hunt anymore' question was eliminated because it associated with the construct the loosest. Further, the 'I talk about hunting with friends and/or family' item was eliminated because it did not uniformly apply to all respondents, as there are variabilities on number of friends and family members and the desired topics of discussion. The Behavior construct (α = 0.89), could have been left with all four questions, but the 'I would go hunting, even if I had to go by myself sometimes' question would not perform well for minors who are often dependent upon others for transportation or for owning some types of hunting equipment. The Community construct (α = 0.90), started with six questions, but, for brevity's sake, we eliminated 'I am a part of formal or informal hunting groups or organizations' because it was associated the loosest with the other questions in the scale and it mismeasured some individuals in the pretest sample, likely due to factors associated with introversion. Additionally, the 'I would be willing to take a friend hunting' question was eliminated because it also did not perform as well is a specific subset of respondents, likely in individuals who use hunting to seek solitude from others and from modern living. At the end of the pretest, we were able to achieve extremely high reliability on all three constructs associated with the ABC identity factors and do so in a minimally-invasive10-question battery.

Approach

We partnered with the Alabama Department of Conservation and Natural Resources, the Nebraska Game and Parks Commission, the Tennessee Wildlife Federation (in partnership with Tennessee Wildlife Resources Agency), and the Utah Division of Wildlife Resources (hereafter referred to as "collaborating SFWAs" when distinguishing them from all SFWAs).The four collaborating SFWAs were selected by weighing the factors of 1) willingness and ability to collaborate, 2) balancing geographic representation of SFWA regions, and 3) presence of preexisting pre-event and post-event surveys of R3 efforts. We asked collaborating SFWAs to append the updated 10-item survey battery onto their existing pre-event and post event surveys, during fall and winter 2024, to coincide with the R3 activities of those states during the fall hunting seasons. Where the survey software or technology permitted, the 10-question battery was randomized in the order of presentation to reduce primacy and recency effects and to deter the participant from discerning the underlying constructs and responding to strategically bias the results.

Collaborating SFWAs selected which R3 events to include during the timeframe of the study and returned all pre-and-post event surveys, inclusive of the 10-item battery of the ABC identity factors to the primary investigators. Using a unique identifier provided by each state, data were cleaned, structured, and analyzed following quality assurance/quality control standards established by AAPOR (2021). Pre-event data and post-event data were merged so the data could be compared using a paired t-test (rather than a normal t-test), allowing the primary investigators to take advantage of the fact that many confounding factors were held constant before and after the event. As a result, we can provide meaningful statistical findings with relatively smaller sample sizes.

We computed the three identity factors by taking the arithmetic mean of the first three questions (Aptitude), the next three questions (Behavior), and the last four questions (Community). This process was repeated on both of the pre-event and post-event surveys to generate six values for each participant ($PRE_{Aptitude}$, $PRE_{Behavior}$, $PRE_{Community}$, $POST_{Aptitude}$, $POST_{Behavior}$, and $POST_{Community}$). The pre-event ABC factors for all attendees of each R3 event type were averaged and displayed as a radar graph (figs. 6, 8, 10, & 12).

To calculate the effectiveness of each R3 event type at changing the ABCs of attendees, the pre-event ABC factors were subtracted from the corresponding post-event ABC factors, creating an estimate of $\Delta_{Aptitude}$, $\Delta_{Behavior}$, and $\Delta_{Community}$. The change in ABC factors for all attendees of each R3 event type were then averaged and displayed as a bar graph (figs. 7, 9, 11, & 13).

To assist in identifying 'next steps' in hunter identity formation, we created a strategic orientation matrix for each collaborating SFWA. To inform the creation of the matrix, R3 practitioners of each collaborating SFWA were interviewed for a comprehensive list of their R3 events. The primary investigators reviewed the list of all R3 events provided by each collaborating SFWA, then narrowed to R3 event types that are regularly-occurring, identifiable events. The primary investigators then used their expertise and judgement to determine each event's suitability for hunters' needs, according to their ABC identity factors (i.e., they made initial determinations on whether an R3 event was low, medium, or high in regards to Aptitude, Behavior, and Community). Where possible, each collaborating SFWA's R3 professional(s) verified or adjusted the judgements of the primary investigators according to their experience directing the R3 programs within their state. The preliminary nature of the strategic orientation matrix allows for conceptualization of the ABC approach, but because this process relies on the subjectiveness of expert opinion, these preliminary assessments must be confirmed in future research.

FINDINGS

As is common, many of the R3 events hosted by the four collaborating SFWAs had younger participants (fig. 4). Tennessee attracted the most adults, with the exception of their youth hunts. Alabama attracted largely people in their 20's (through their Collegiate and Hunting 101 programs), though the Multiday Mentored Hunt had about half in their 20's and about half in their 30's. Utah had the youngest participation in the Mentored Beginner Pheasant Hunts, with half of the attendees younger than 16 –22 years of age, depending on the location.

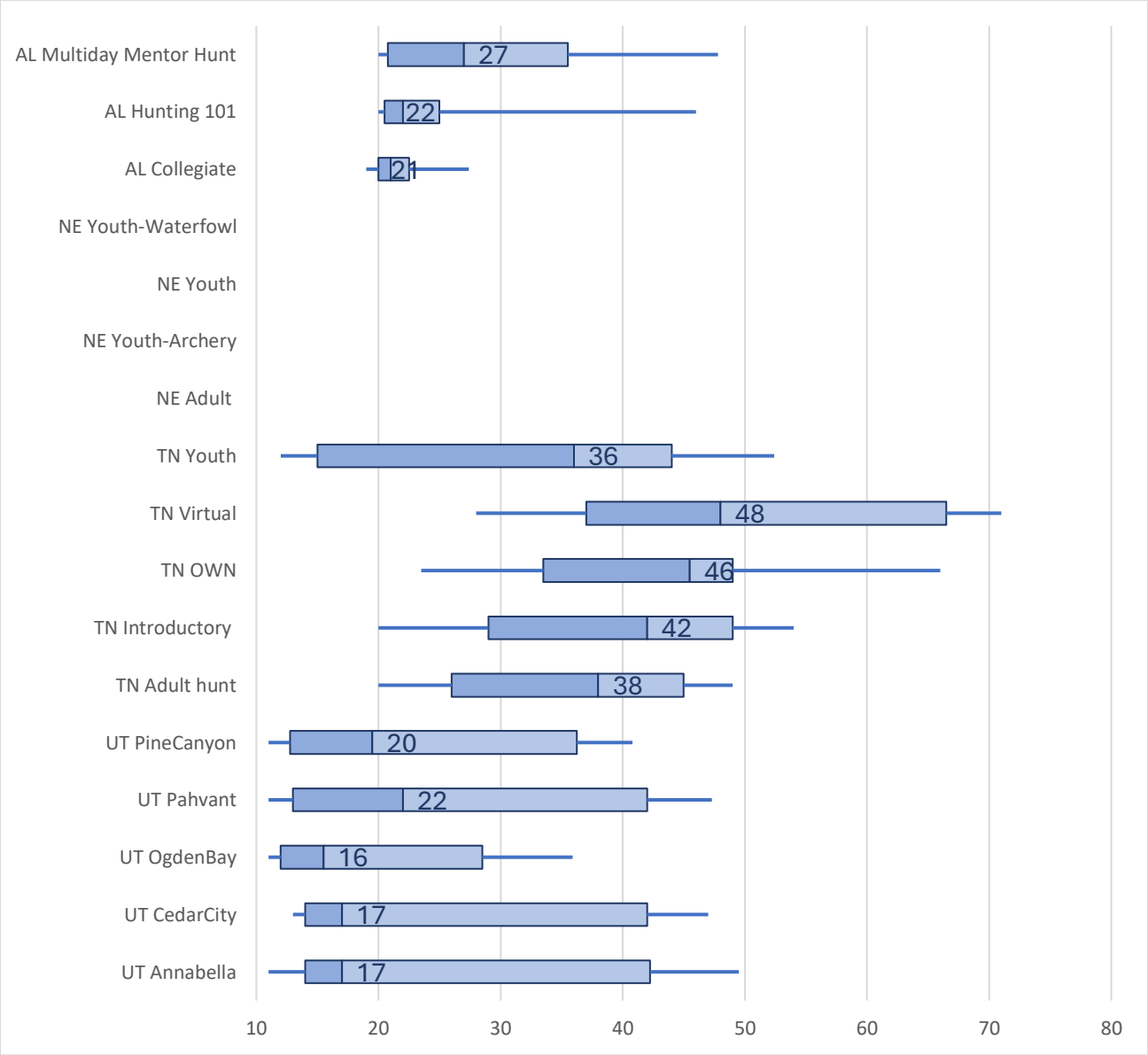


Figure 4. Age distributions for R3 event types of the collaborating SFWAs. The number in blue is the median age of attendees for each event, the shaded box plots is the middle 50% of the age distribution, and the whiskers are 90% of the age distribution.

**Nebraska was unable to provide age-related information, so those four event types are blank.*

With a few exceptions, the selected R3 event types attracted mostly males (fig. 5). The first exception included the four Outdoor Women of Nashville events, which had 18 women attendees at two rifle deer hunts, an archery deer hunt, and a waterfowl hunt. The second exception was Nebraska's mentored adult deer hunt, which had solely women attending. This event was not an exclusively women-oriented event, but the event was a smaller, boutique experience wherein only a few women attended. There were other events that were more balanced among sexes, such as Utah's Ogden Bay hunt (60% male) and Tennessee's adult hunt (67% male). If having more female representation is desired in R3 events, an evaluation of these events may yield fruitful information on how to engage new, female hunters.

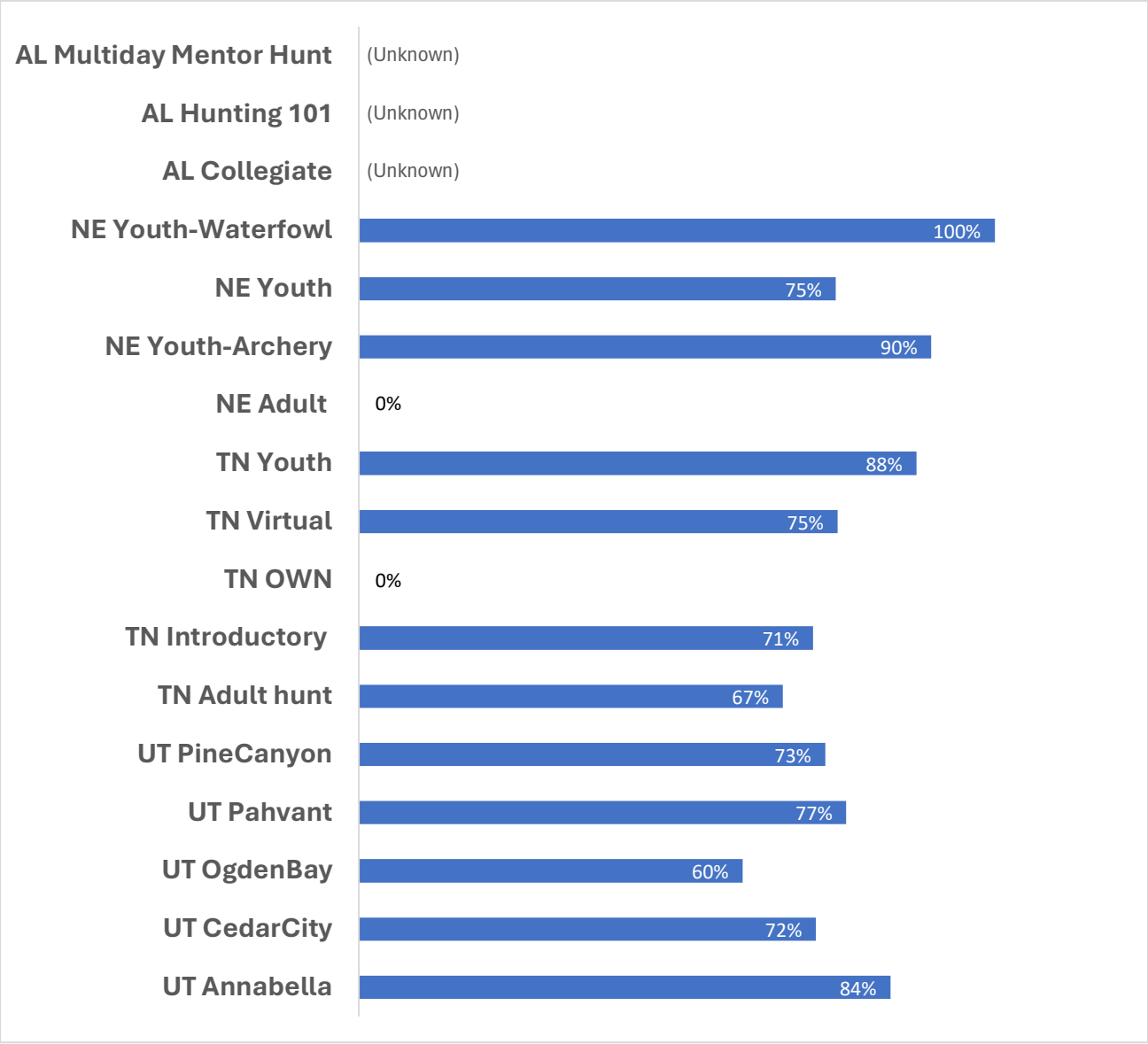


Figure 5. Percentage of male attendees who attended each R3 event types for the four collaborating SFWAs.
** Alabama was unable to provide sex of attendee.*

State Findings

Alabama Department of Conservation and Natural Resources

During the data collection period of fall and winter 2024, Alabama Department of Conservation and Natural Resources conducted three major types of R3 events:

1. **Collegiate events.** These events included Alabama A&M, Auburn, and University of Montevallo sponsored events and a mix of rifle deer hunts, crossbow hunts, and Outdoor Scholar trips.
2. **Hunting 101 classes.** These events focused on fundamentals of rifle deer and crossbow deer hunting, but did not target university students specifically.
3. **Multiday mentored hunt events.** These mentored hunts included bow, crossbow, and rifle deer hunts. These events were held primarily at Oak Mountain State Park and the Portland Landing Special Opportunity Areas, though there were other areas included.

A total of 56 Alabamans participated in these R3 efforts. These three major types of R3 events generally attracted participants who rated themselves low on each of the three factors of

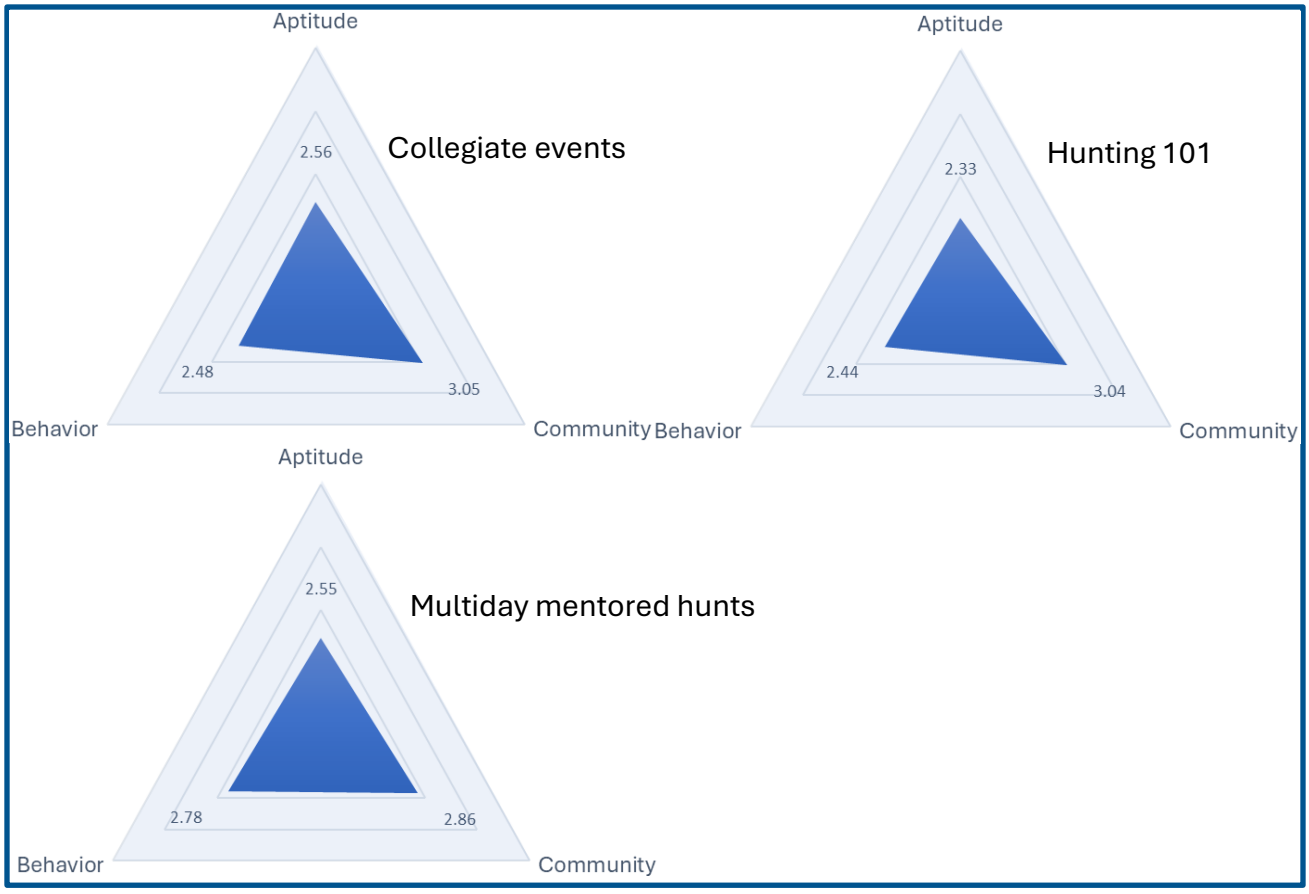


Figure 6. Results for the Alabama pre-event questionnaire. This information is useful in understanding what type of hunter an R3 event is attracting. For the most part, Alabama R3 events attracted new hunters who were lower on all three factors of identity.

identity (Aptitude, Behavior, and Community) in the pre-event questionnaire (fig. 6). This is consistent with the **Beginner** type from the hunter typology. The exception may be the Hunting 101 events, whose participants seem to have a relatively higher self-assessment of the Community factor indicating some may be **Affiliate** type. This is fortuitous as each type of R3 event is designed for novice hunters.

The difference between the attendees' pre-event measures of identity factors and the attendees' post-event measures gives an estimate of how effective the event was to the individual or how much the event 'moved the needle' in terms of identify formation. For example, attendees at the Collegiate event types measured an average of 2.56 on Aptitude (fig. 6) in pre-event assessments. The same attendees increased an average of 0.63 after the event (fig. 7). In Alabama, all three R3 event types increased the three factors of identity (t_{apt} = 5.58, p <0.001; t_{beh} = 3.90, p <0.001; t_{com} = 4.43, p <0.001). Hunting 101 events were the most successful at moving each identity factor. As expected, events appealing to the university student attracted people who might have temporarily lost their family, as there was lift associated in the Community factor. Mentored hunts moved on Aptitude the most, explicably since the '101' in the name suggests that it is intentioned for the novice hunter, who may have much to learn about hunting or may require state-specific mentoring.

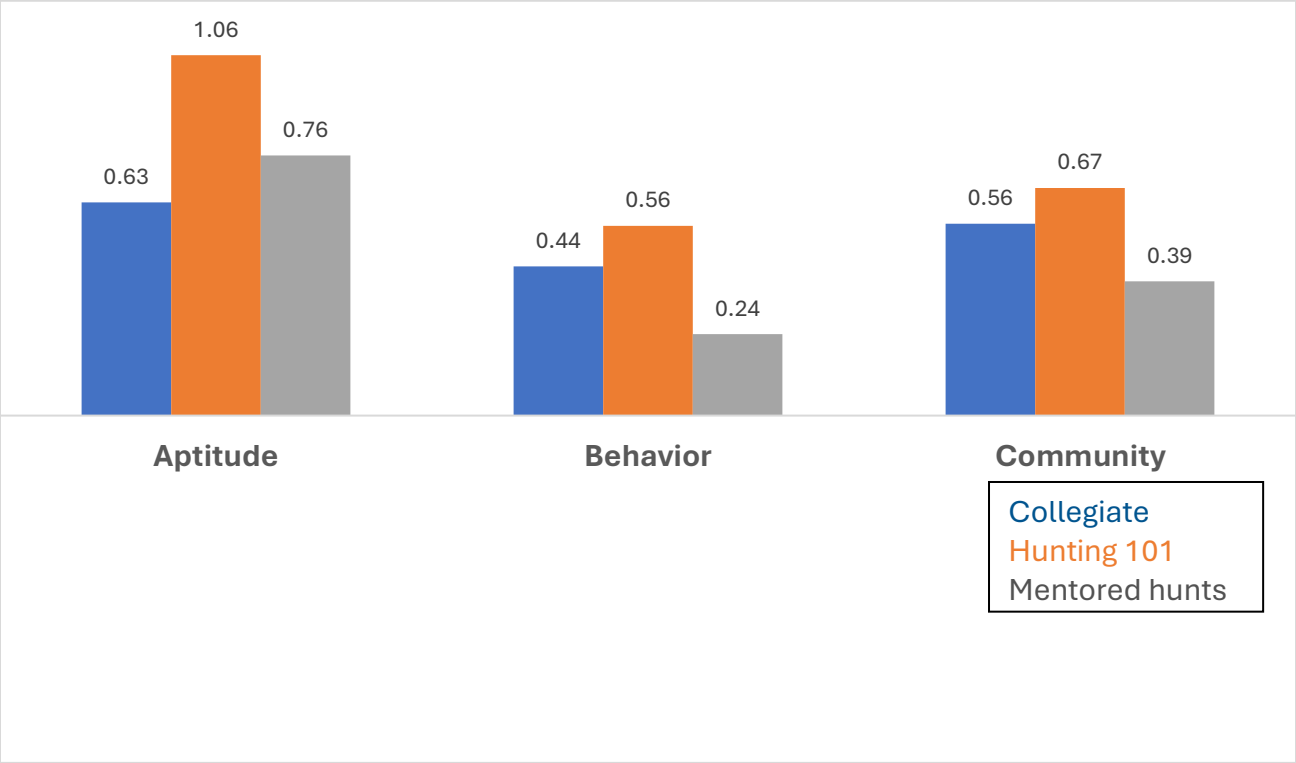


*Figure 7. In Alabama, all three event types (*Collegiate, Hunting 101, *and* Mentored hunts*) increased all three identity factors of Aptitude, Behavior, and Community. The value shown above each bar indicates the change between the pre-event survey and the post-event survey. In this case,* Hunting 101 *events show the most improvement in each of the three identity factors.*

Table 4. Strategic Orientation Matrix for selected Alabama R3 events. For each event, there is a rating of High (purple), Medium (teal) and Low (yellow), for Aptitude, Behavior, and Community. The ratings are approximate and subject to change as the events themselves evolve. The ratings are meant to capture what type of outdoor recreationist would benefit from attending such an event. This is intended to be used in combination with the assessment tool in Appendix A to assist constituents in their decision of which R3 event to attend next, as depicted in fig. 14.

Event name	A	B	C
Creek Kids	Low	Low	Low
Free Fishing Day	Low	Low	Low
Growing Up WILD	Low	Low	Low
Project WILD	Low	Low	Low
Firearms 101 Workshops	Low	Low	Medium
Hunters Helping the Hungry	Low	Low	Medium
Outdoor Academy 101 Workshops	Low	Low	Medium
Go Fish, Alabama	Low	Medium	Medium
Outdoor Alabama Wild Eats	Low	Medium	Medium
Becoming an Outdoor Woman	Low	Medium	High
Boater Education	Medium	Low	Low
Hunter Education	Medium	Low	Low
Youth Squirrel Hunting	Medium	Low	Medium
Adult Mentored Hunt Program	Medium	Low	High
Archery in the Schools	Medium	Low	High
Youth Dove Hunting	Medium	Low	High
Youth Turkey Hunting	Medium	Medium	Low
Youth Deer Hunting	Medium	Medium	Medium
Youth Waterfowl Hunting	Medium	Medium	Medium
Becoming a Hunter Ed Teacher	Medium	Medium	High
Campus Conservation Program	Medium	Medium	High
Bowhunter Education (Virtual)	High	Medium	Low
Youth Trapping Workshops	High	Medium	High

Low
Medium
High

Nebraska Game and Parks Commission

During the data collection period of fall and winter 2024, the Nebraska Game and Parks Commission conducted four types of R3 events:

1. **Adult mentored hunt.** Rifle deer hunting events focused solely on adult participants in a mentored setting.
2. **Youth mentored hunt.** Rifle deer hunting events focused on youth participants in a mentored setting.
3. **Youth mentored archery hunt.** Archery deer hunting events focused on youth participants in a mentored setting.
4. **Youth mentored duck hunt.** Waterfowl hunting events focused on youth participants in a mentored setting.

A total of 21 Nebraskans participated in these R3 efforts. Adult and Youth types of R3 events generally attracted participants who rated themselves low on each of the three factors of identity (Aptitude, Behavior, and Community) in the pre-event questionnaire (the top two

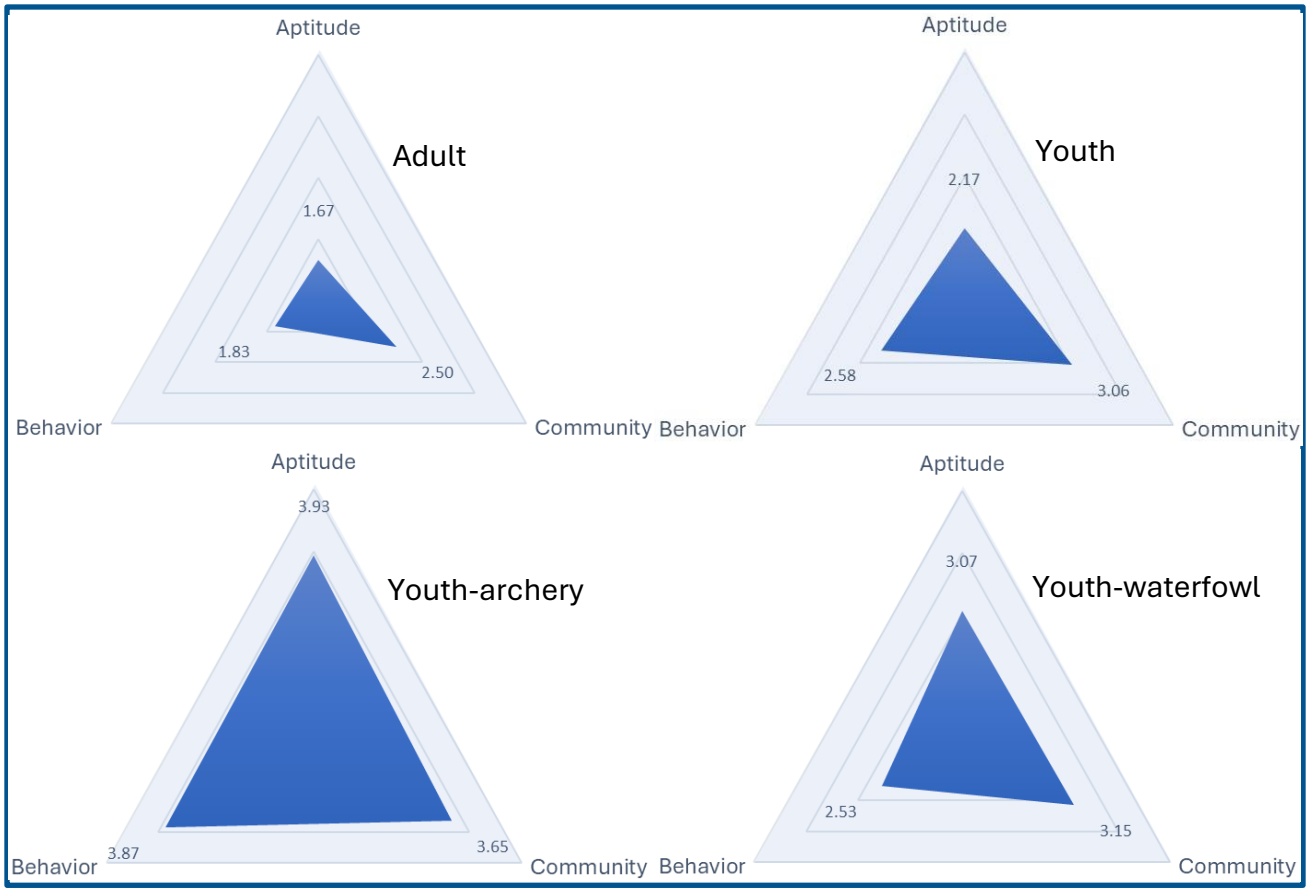


Figure 8. Results for the Nebraska pre-event questionnaire. This information is useful to understand what type of hunter an R3 event is attracting. The Adult and Youth R3 events are attracting new hunters who are lower on all three factors of identity. The more specializes youth events (Archery and Waterfowl) are attracting more individuals who are higher on identity factors.

triangles in fig. 8) indicating a **Beginner** hunter type. However, the youth events that used specialized gear (Youth-Archery) or pursued specialty game (Youth-Waterfowl) tended to attract hunters who were the **All-in** hunter type, and therefore higher on the factors of hunter identity. Presumably, this is due to the fact that participants have already attained proficiency in hunting; they are now seeking opportunities to expand their Aptitude through new techniques and by pursuing additional game species.

The difference between the attendees' pre-event measures of identity factors and the attendees' post-event measures gives an estimate of how effective the event was for the individual. For example, attendees of the Adult Mentor hunts measured an average of 1.67 on Aptitude (fig. 8) in pre-event assessments. The same attendees increased an average of 0.67 after the event (fig. 9). In Nebraska, the four R3 event types had mixed results for the three factors of identity (t_{apt} = 0.52, p =.30; t_{beh} = 0.53, p =.30; t_{com} = 0.90, p =19), but results may be hindered by a limited sample size and the bidirectional nature of the effects. The Youth Waterfowl event was beneficial to identity factors, particularly the Community and Behavior factors. The Youth and Youth-Archery indicated negative movement, which could be explained by the small sample size, or, alternatively, by the fact that young males are particularly susceptible to the Dunning-Kruger Effect (see discussion, page 34 [Prims & Moore, 2017; O'Malley, 2024]).

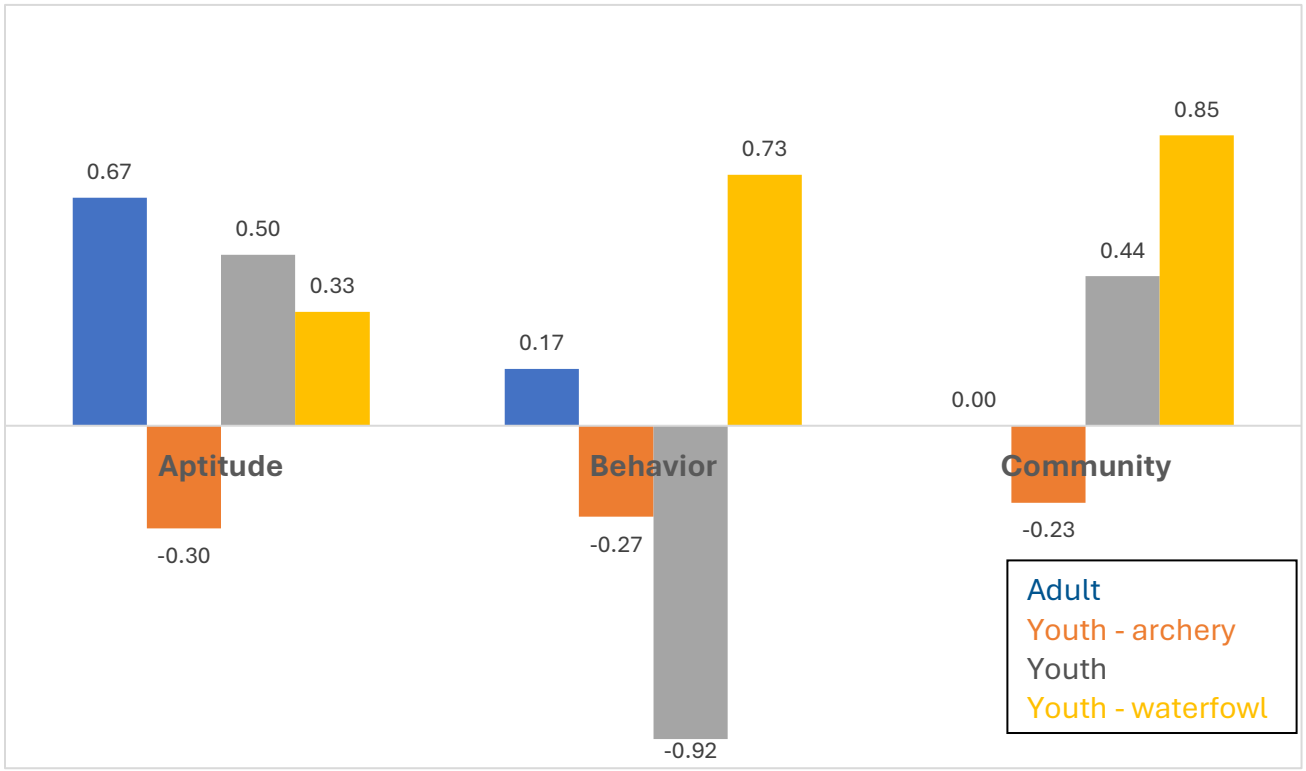


Figure 9. In Nebraska, the four event types (Adult, Youth, Youth-Archery, Youth-Waterfowl hunts) had mixed results on their effect on the identity factors of Aptitude, Behavior, and Community. The value shown above each bar indicates the change between the pre-event survey and the post-event survey.

Table 5. Strategic Orientation Matrix for selected Nebraska R3 events. For each event, there is a rating of High (purple), Medium (teal) and Low (yellow), for Aptitude, Behavior, and Community. The ratings are approximate and subject to change as the events themselves evolve. The ratings are meant to capture what type of outdoor recreationist would benefit from attending such an event. This is intended to be used in combination with the assessment tool in Appendix A to assist constituents in their decision of which R3 event to attend next, as depicted in fig. 14.

Event name	A	B	C
Becoming an Outdoors Family	Low	Low	Low
Bowring Ranch Deer Camp	Low	Low	Low
Facebook Live Q&A (Deer & Turkey)	Low	Low	Low
Learn to Hunt Workshops	Low	Low	Low
Ponca/Niobrara Youth Hunt	Low	Low	Low
Southeast District Deer Hunt	Low	Low	Low
Beau Turner Youth Mentor Hunt	Low	Low	Medium
Ladies Day at the Range	Low	Low	Medium
Women's Hunter Education Weekend	Low	Low	Medium
Beyond BOW - Handgun	Low	Low	High
Western NE Goose Camp	Low	Medium	Medium
National Archery in the Schools	Low	Medium	High
Youth Mentor Hunts (Pheasant)	Low	Medium	High
Ash Hollow Youth Waterfowl Hunt	Medium	Low	Low
Platte Valley Strutters Jakes Hunt	Medium	Low	Low
Waterfowl Mentor Program	Medium	Low	Low
Beau Turner Adult Mentor Hunt	Medium	Low	Medium
Ladies Learn to Hunt Pheasant	Medium	Low	Medium
Next Steps - Pheasant	Medium	Medium	Low
Last Chance Deer Camp	Medium	Medium	Medium
Mentor Youth Archery Program	Medium	Medium	Medium
Becoming an Outdoors Woman	Medium	Medium	High
Beyond BOW - Archery	Medium	Medium	High
Beyond BOW - Shotgun	Medium	Medium	High
Ladies Hunting Cohort	Medium	Medium	High

Low
Medium
High

Tennessee Wildlife Federation

During the data collection period of fall and winter 2024, the Tennessee Wildlife Federation (in partnership with Tennessee Wildlife Resources Agency) conducted five major types of R3 events:

1. **Adult mentored hunting.** Events included archery deer, rifle deer, and several advanced waterfowl workshops and events.
2. **Introductory.** Events included introductory rifle deer, introductory waterfowl hunts, and a few Learn to Shoot events across several geographies of the state.
3. **Outdoor Women of Nashville.** Events include an archery deer, two rifle deer, and a waterfowl event.
4. **Virtual classes.** Events were held virtually; the 14 events differed in the game pursued and the equipment used. These events ranged from a few introductory events on waterfowl, trapping, and shooting, to a few advanced or specialized classes on crow hunting, deer scoring, hunting with dogs, and game cooking.
5. **Youth.** Two events focused on deer hunting and rabbit hunting.

A total of 282 Tennesseans participated in these R3 efforts. The five major types of R3 events generally attracted **Beginner** hunter types who rated themselves low or moderately low on each of the three factors of identity (Aptitude, Behavior, and Community) in the pre-event questionnaire (fig. 10). As expected, those who signed up for the virtual workshops tended to be relatively lower on Aptitude, as virtual workshops would appeal to attendees focused on

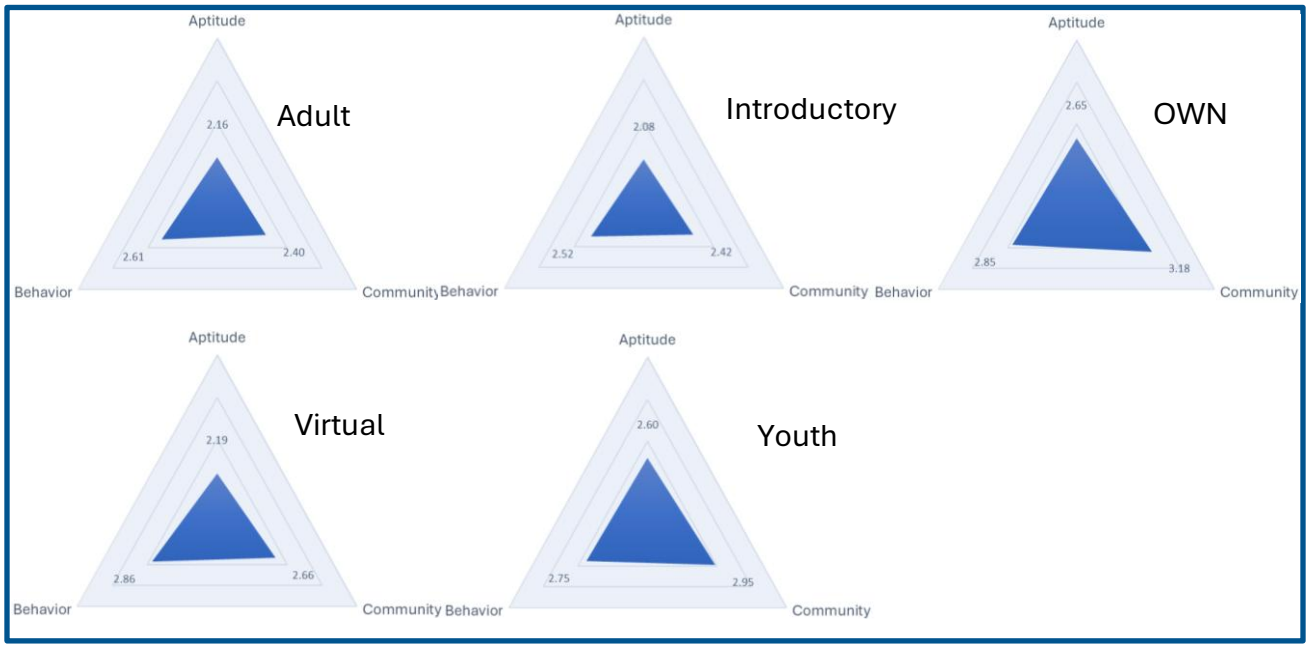


Figure 10. Results for the Tennessee pre-event questionnaire. This information is useful to understand what type of hunter an R3 event is attracting. For the most part, Tennessee R3 events are attracting new hunters who are lower on all three factors of identity.

knowledge acquisition. Outdoor Women of Nashville (OWN) events were the highest R3 event type on the Community factor, suggesting that those attendees may have engaged with OWN previously and are **Affiliate** hunter types.

The difference between the attendees' pre-event measures of identity factors and the attendees' post-event measures gives an estimate of how effective the event was for the individual. For example, attendees of the adult mentor hunts measured an average of 2.16 on Aptitude (fig. 10) in pre-event assessments. The same attendees increased an average of 0.81 after the event (fig. 11). In Tennessee, the improvement on all three factors of identity due to an R3 event is a noteworthy finding (t_{apt} = 8.54, p <0.001; t_{beh} = 3.87, p <0.001; t_{com} = 8.48, p <0.001). The Outdoor Women of Nashville (OWN) showed the biggest movement on the Community and Behavior factors; in fact, OWN had the biggest movement on any of the factors of the collaborating SFWAs included in this report. However, of the Tennessee R3 events, OWN did the least to move the Aptitude factor. Interestingly, of the Tennessee R3 events, the virtual workshops did the most to improve the Aptitude factor, followed by the Adult Mentored hunting events. This suggests that if information transfer is the only goal, SFWAs could offer virtual workshops and save significant resources and staff time. In so doing, however, they are doing little to lift Behavior or Community factors.

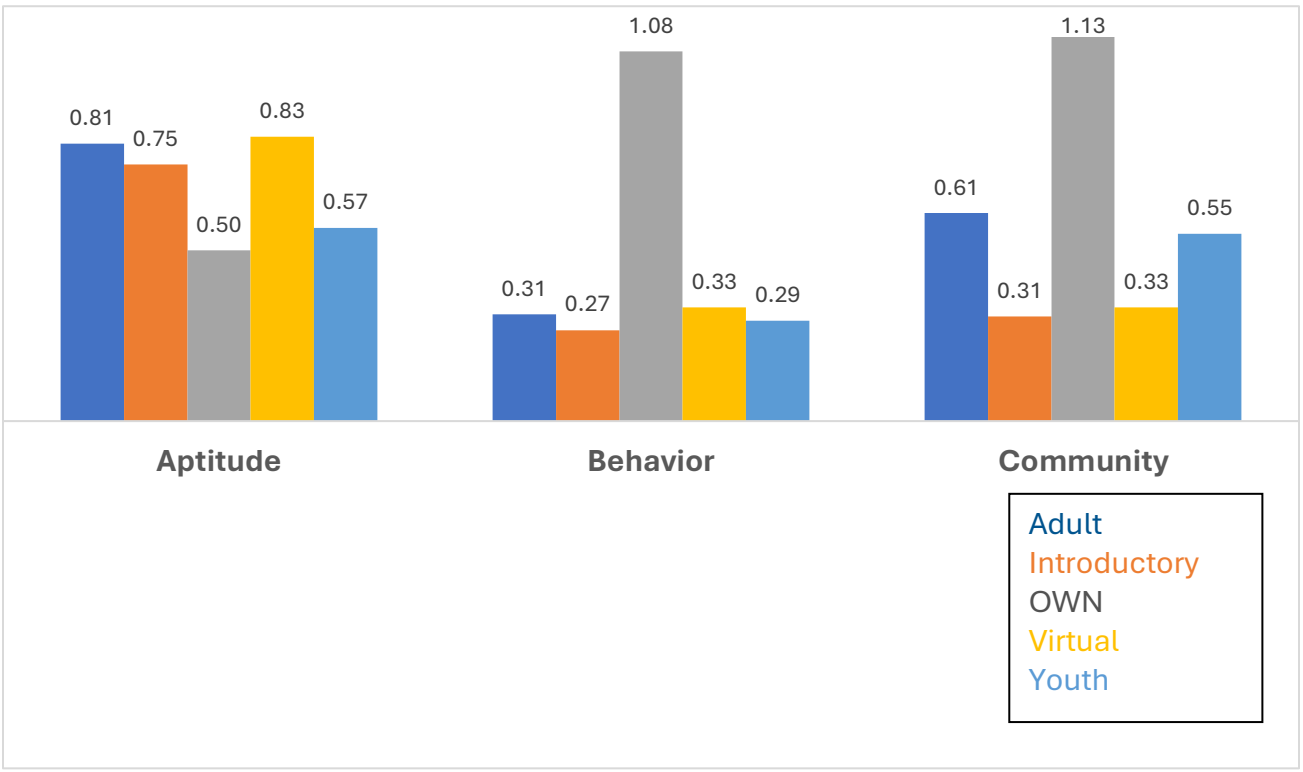


Figure 11. In Tennessee, all five event types increased each of the three identity factors of Aptitude, Behavior, and Community. The value shown above each bar indicates the change between the pre-event survey and the post-event survey. In this case, Outdoor Women of Nashville (OWN) events show the most improvement in Behavior and Community, but the least movement in Aptitude.

Table 6. Strategic Orientation Matrix for selected Tennessee R3 events. For each event, there is a rating of High (purple), Medium (teal) and Low (yellow), for Aptitude, Behavior, and Community. The ratings are approximate and subject to change as the events themselves evolve. The ratings are meant to capture what type of outdoor recreationist would benefit from attending such an event. This is intended to be used in combination with the assessment tool in Appendix A to assist constituents in their decision of which R3 event to attend next, as depicted in fig. 14.

Event name	A	B	C
Deer Season Virtual Check-in	Low	Low	Low
Intro to Deer Hunting Workshop	Low	Low	Low
Intro to Turkey Hunting Workshop	Low	Low	Low
Intro to Waterfowl Hunting Workshop	Low	Low	Low
Learn to Shoot Workshop	Low	Low	Low
Virtual Hunting Skills	Low	Low	Low
Virtual Introductory Workshops	Low	Low	Low
Virtual Outdoor Skills	Low	Low	Low
Virtual Small Game	Low	Low	Low
Youth Rabbit Hunts	Low	Low	Low
Youth Raccoon Hunts	Low	Low	Low
Youth Squirrel Hunts	Low	Low	Medium
Virtual 4-H Project	Low	Low	High
Academics Afield	Low	Medium	Medium
Collegiate Hunts	Low	Medium	Medium
Virtual Archery Hunting	Medium	Low	Low
Youth Deer Hunts	Medium	Low	Low
Youth Dove Hunts	Medium	Low	Low
Youth Turkey Hunts	Medium	Low	Low
Davis P. Rice Memorial Waterfowl Hunt	Medium	Low	Medium
Adult Archery Deer Hunts	Medium	Medium	Low
Adult Rabbit Hunts	Medium	Medium	Low
Adult Rifle Deer Hunts	Medium	Medium	Low
Adult Turkey Hunts	Medium	Medium	Low
Virtual Big Game	Medium	Medium	Low
Virtual Cooking & Preparation	Medium	Medium	Medium
Outdoor Women of Nashville	Medium	Medium	High
Advanced Turkey Hunting Workshop	High	Medium	Low
Advanced Waterfowl Hunting Workshop	High	Medium	Low
Specialty Virtual Classes	High	Medium	Low

Low
Medium
High

Utah Division of Wildlife Resources

Utah Division of Wildlife Resources was slightly different from the other three collaborating SFWAs in this research project, in that instead of focusing evaluation efforts on multiple types of R3 events, they focused on five replications of the same **Beginner Mentored Pheasant Hunts**. These five pheasant hunts were conducted in or near *Cedar City, Ogden, Pahvant, Pine Canyon,* and *Annabella*. This approach allowed for a unique study design that allowed us to study the ABC factors between event types (in the other three collaborating SFWAs), but also understand the variability in ABC factors that is attributable to the execution within the same event. Throughout the remainder of the study, these five replications will be treated at the same analysis level as the R3 event types of other collaborating SFWAs.

A total of 453 Utahns participated in these R3 efforts. The participants were largely male (60% – 84%), and were mostly youth (medians of 16 – 22 years of age). As anticipated, the five mentored pheasant hunting events each attracted the same type of hunter who rated themselves moderately on each of the three factors of identity (Aptitude, Behavior, and Community) in the pre-event questionnaire (fig. 12). In fact, nearly all of the ratings of the three identity factors were within 0.5 of the mid-point of the scale (3 on a 5-point scale), indicating **Beginner**, and a mix of **Recently Relocated**, **Tenuous**, and **Teenager-of-a-Hunter** types are attracted to these events. Interestingly, in all five replications of Utah's mentored pheasant hunts the average Community rating is slightly higher than the Aptitude and Behavior factors.

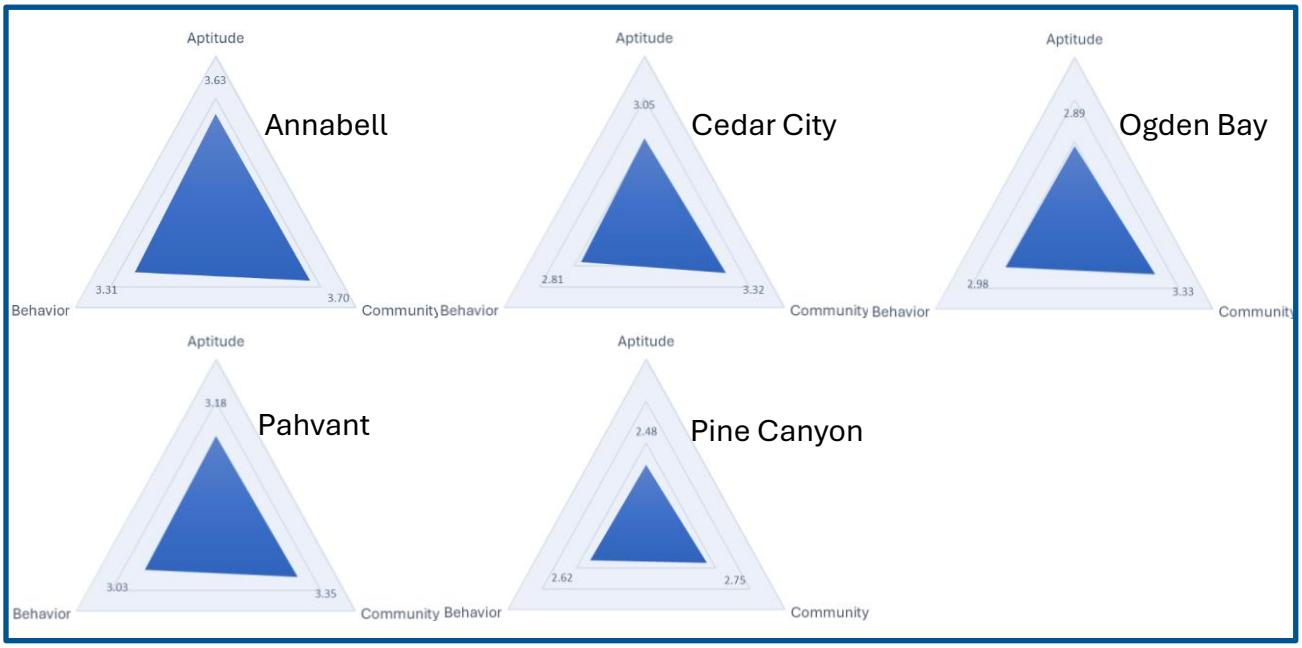


Figure 12. Results for the Utah pre-event questionnaire. This information is useful to understand what type of hunter an R3 event is attracting. As expected, all five events are attracting similar types of hunters, as these are replications of similar events.

The difference between the attendees' pre-event measures of identity factors and the attendees' post-event measures gives an estimate of how effective the event was to the individual or how much the event 'moved the needle' on identity formation. For example, attendees of the Annabella hunt measured an average of 3.63 on Aptitude (fig. 12) in pre-event assessments. The same attendees increased an average of 0.20 after the event (fig. 13). In Utah, the hunts, in aggregate, increased Aptitude and Behavior, but decreased in Community (t_{apt} = 2.05, p =0.022; t_{beh} = 5.71, p <0.001; t_{com} = 2.82, p =0.003). This was a significant difference between the pre-event and post-event measurements.

The decrease in the Community factor cannot be dismissed by a small sample size as is the case with Nebraska (Utah n=453). However, these events were mostly male, and had some of the lowest aggregate ages, which could make these data particularly susceptible to the Dunning-Kruger Effect (see discussion, page 34 [Prims & Moore, 2017; O'Malley, 2024]).

Interestingly, there is variation *between* the five replications of the mentored pheasant hunts on all three identity factors. Yet, there is not a statistically significant difference between how much the hunts affected the Aptitude ($F_{4,87}$ = 1.14, p=ns, η^2=0.05), Behavior ($F_{4,87}$ = 0.33, p=ns, η^2=0.015), or Community ($F_{4,87}$ = 0.30, p=ns, η^2=0.014) factors.

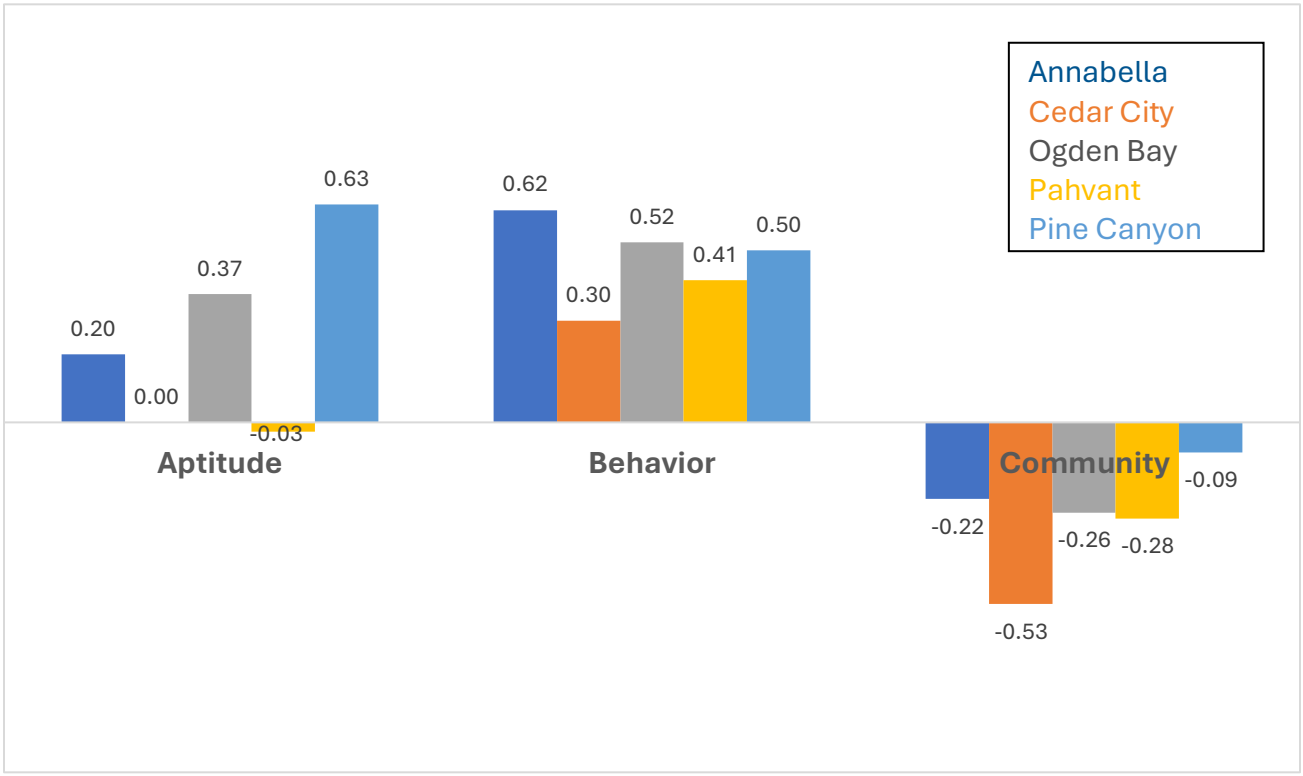


Figure 13. In Utah, all five replications of mentored pheasant hunts showed increases in the Behavior factor and decreases in the Community factor. Movement on the Aptitude factor were mixed. The value shown above each bar indicates the change between the pre-event survey and the post-event survey.

Table 7. Strategic Orientation Matrix for selected Utah R3 events. For each event, there is a rating of High (purple), Medium (teal) and Low (yellow), for Aptitude, Behavior, and Community. The ratings are approximate and subject to change as the events themselves evolve. The ratings are meant to capture what type of outdoor recreationist would benefit from attending such an event. This is intended to be used in combination with the assessment tool in Appendix A to assist constituents in their decision of which R3 event to attend next, as depicted in fig. 14.

Event name	A	B	C
C.A.S.T. for Kids	Low	Low	Low
Cops and Bobbers	Low	Low	Low
First Duck Hunt	Low	Low	Low
First Shots Clay Trap Clinic	Low	Low	Medium
35th Annual .22 Josie Shoot	Low	Medium	Low
Waterfowl Hunting Basics Seminar	Low	Medium	Low
Women on the Water Fishing Tournament	Low	Medium	Low
Women's Shooting Sports Clinic	Medium	Low	Low
Waterfowl Decoys Workshop	Medium	Low	Medium
Beginner Mentored Pheasant Hunts	Medium	Low	Medium
Duck Calling Seminar	Medium	Medium	Low
Osprey Watch	Medium	Medium	Low
Women's Turkey Hunting Clinic	Medium	Medium	Low
Bald Eagle Viewing Day	Medium	Medium	Medium
Bat Festival	Medium	Medium	Medium
Delta Waterfowl Youth Clinic	Medium	Medium	Medium
Turkey Hunting Seminar	Medium	Medium	Medium
Upland Game Hunting Seminar	Medium	Medium	High
Archery Clinic	Medium	High	Medium
Wild Game Cooking Clinic	Medium	High	Medium
BHA- Big Game Hunting Workshops	High	Low	Low
What to Do After the Shot - Seminar	High	Low	Medium
Kayak Fishing Clinic	High	Medium	Medium
Sporting Clays Shooting Clinic	High	Medium	Medium
Women's Introductory Archery Clinic	High	Medium	Medium
4H Trapper/Fur Seminar	High	High	Medium
Fly Fishing Clinic	High	High	Medium
Fly Tying Clinic	High	High	Medium
Pointing Dog Seminar	High	High	Medium

Low
Medium
High

DISCUSSION

The purpose of this study is to provide an additional theoretical framework to support R3 practitioners in their efforts to more effectively advance individuals from a position of considering hunting, to someone who participates in hunting, to someone who identifies as a hunter. If R3 efforts can move someone to develop their identity as a hunter, the probability of them being retained long-term is significantly higher.

Overall, the four collaborating SFWAs that collaborated in this study are, at the time of this writing, doing an exceptional job at attracting new hunters to their R3 events. Additionally, several R3 events included in this study attracted more experienced hunters, broadening the scope of this research. For example, in Nebraska, the Youth Archery program is one of the few events that allows people to return to the event in subsequent years. As a result, the average ratings of the ABC identity factors are relatively higher for that event. An interesting juxtaposition is a replication of a Utah Mentored Pheasant hunt that is strict about allowing just newer hunters into the event, and is quite successful at enrolling only those would may benefit the most from the event.

Further, as evidenced by the organizations partnering on this study, SFWAs are becoming far more sophisticated in their methods when compared to the period directly following the publication of the ORAM and the National Hunting and Shooting Sports Action Plan. For example, Nebraska is intentionally targeting women in their advertising for several of their efforts. In the Utah Odgen Bay Mentored Pheasant hunt, a certain portion of registrations are set aside specifically for women, and this event is subsequently one of the most attended by women. Another example of the emerging intentionality of R3 recruitment is that Nebraska and Utah hold their youth waterfowl events and youth pheasant hunts immediately prior to the general seasons in their respective states. This intentional scheduling allows for the youth to get specialized attention within the hunting process, under favorable conditions; the youth can then go on to experience the general season with their families and friends. This scheduling approach allows the parents of recruited youth to learn alongside their children, and then to reinforce those learnings within an ideal timeframe.

Additional, novel tactics to increase R3 efforts were demonstrated by the collaborating SFWAs in this study. Since a strategic decision in 2019, Tennessee has intentionally targeted their advertising efforts at adults. Perhaps as a result, the virtual workshops that are being held in Tennessee are capturing younger Baby Boomer and older Gen X individuals. This is in contrast to Utah's Mentored Pheasant hunts, whose median ages were in the teens and early 20s. According to the Utah Division of Wildlife Resources staff, there are a few mitigating factors that make the average age of R3 event attendees so young: they limit the hunts to first-time hunters only, they advertise to hunter education graduates, and their collaborating partner is primarily interested in recruiting youth hunters.

The Utah portion of this project focused on executing the same R3 event, replicated in five locations. This allowed us to disentangle the effects of the event type (in this case held constant, by the five different ways of executing the same pheasant hunt) from the execution of those events (which differed on who ran the event, the location of the event, and the event history/culture). In this study, the magnitude of the effect attributable to the event type was larger than the effect attributable to the execution of the event. Nevertheless, the execution did have some minimal effects on how much R3 event attendees indicated the event moved their ABC identity factors. Further research is needed to examine this relationship (using a nested study design).

In the Utah Mentored Pheasant hunts, and in some of the Nebraska youth events, a few of the ABC identity factors decreased after having attended an event. This is counterintuitive since the purpose of R3 events are designed to augment the self-identification process. A few of these results could be explained by a smaller sample size, as in the case of Nebraska, however, others cannot be attributed to the statistical process. Although we cannot say with certainty why this result was found, one explanation for this phenomenon may be the Dunning-Kruger effect (Kruger & Dunning, 1999; Dunning, 2011). This effect is a cognitive bias in which individuals with low ability in a given domain tend to overestimate their competence in that same domain, in this case, Aptitude, Behavior, and Community. The overestimation of competence is not simply due to ignorance, but stems from a lack of metacognitive awareness. That is, those who are least skilled/knowledgeable are also least able to recognize skill deficits and ignorance in themselves. This effect is particularly notable in domains where truly skilled individuals make their participation look effortless to others, as is certainly the case with hunting. This effect is often observed more in males (Klayman et al., 1999; O'Malley, 2024), and in youth (Ehrlinger et al., 2008; Prims & Moore, 2017). This may partially explain why youth-oriented events have the most negative change in the ABC identity factors. That is, the unearned confidence of youth is observed in the pre-event measurement, and then the youth attends the event and more fully comprehends just how little they know. Then, in the post-event questionnaire, they are more aware of their ignorance and that is reflected in their responses.

Another explanation for the selected decrease in Community, outside of the Dunning-Kruger effect, could be that some participants attended an event, observed others participating with family or friends, and felt lonelier because they did not have a support structure or their support structure looked differently. The decrease may also be a reflection of the type of hunt, because it is a morning-only hunt and most participants leave by noon, thereby a cohesive Community would not have time to form. Further, pheasant hunts preclude novice hunters from being in extended direct contact. If the event were to extend overnight, with shared meals, tasks, and leisure time, that may lift the Community aspect of the hunt. A final

explanation may be that younger generations, in general, believe they have less Community, and Utah's events were disproportionately attended by younger participants.

Recommendations to Consider

Based upon the findings of this study and the perspectives gained in developing the ABC approach to R3 effort design and evaluation, we recommend the following:

1) **Measure the ABC identity factors as standard business practice.** Most SFWAs are conducting evaluations of R3 events and include demographical questions, satisfaction, and behavioral intentions. We recommend adding the 10-question battery measuring ABC identity factors to R3 event evaluations.
2) **Design R3 events with intentionality.** We recommend that R3 events be designed with the ABCs of hunter identity formation in mind. For example, unstructured leisure time in an event may seem like time wasted, when instruction could be taking place. However, existing research indicates that developing Community is as important as developing Aptitude for identity formation. There were some R3 event types that only focused on one component of the ABCs (such as virtual workshops developing Aptitude), and that is acceptable, if not preferable, in some contexts. However, at the end of each event, it would be beneficial to have other R3 offerings presented as next steps so attendees are aware of further development opportunities.
3) **Signal your audience.** It is useful to constituents trying to find experiences commensurate to their individual ABC levels for courses to include the words, 'beginner', 'intermediate', or 'advanced' in the title, or course levels (e.g., Hunting 101), to assist constituents in selecting an appropriate event.
4) **Include ABCs in R3 Event postmortems.** A few SFWAs conduct post-event debriefings with staff to discuss what went well and what could be improved for the next iteration. Discussing the event in terms of ABCs will help administrators, field staff, and partners alike to develop a shared vocabulary to integrate ABCs into events, where appropriate.
5) **Integrate the ABC self-assessment.** The assessment tool in Appendix A is meant to be customized and adapted to each state so that constituents can learn what their hunter type is and what R3 events are most suitable to them. This can be done anytime, and waiting for an event or for the season of R3 events is not necessary.
6) **Make analysis easy.** Accomplishing the objectives of this study required a tremendous amount of data preprocessing, both within and between collaborating SFWAs. So much so, that it is very unlikely that an R3 practitioner would have the time, expertise, or resources needed to conduct these analyses. One solution is to standardize a single, uniform evaluation, applicable to all R3 events of a SFWA, so that ALL responses go into the same survey database (Qualtrics, SurveyPro, SurveyMonkey, etc.). These third-party software providers are reasonably priced and can export data effortlessly through dashboards.
7) **Collect post-event data.** For the collaborating SFWAs, as well as the other SFWAs, collecting post-event surveys of an R3 event is difficult. In this study, only about 1/3rd of attendees

completed the post-event survey, which can lead to errors in estimations. We recommend post-event surveys be conducted before the event attendees depart or incentivizing attendees to complete the survey.

8) **Replicate these findings.** In this study, 786 participants took the pre-event survey, allowing us to discuss types of hunters who are attracted to certain events with very tight estimates (±3.43%). Fewer participants did the post-event questionnaire (*n*= 253, ±6.12%), which is still within acceptable limits of precision. However, replication is needed with more R3 events to give a robust pathway of progression for new hunters. This study is pilot demonstrating an approach for SFWAs to conduct measurements on their own R3 events to verify which events grow Aptitude, Behavior, and Community hunter identity factors.
9) **Continue with virtual events.** Virtual events may be looked down upon by some in the R3 Community. However, virtual events are highly effective at educating and developing the Aptitude factor, particularly in adults. Further, they can be conducted at a fraction of the cost of in-person learning opportunities. In fact, pairing a virtual event with an in-person event would likely lead to resource efficiencies by developing Aptitude virtually, leaving more time to allocate to Behavior and Community during the in-person portion.
10) **Make your own matrix.** The strategic orientation matrix, comparing ABCs for all R3 event types, is designed to benefit constituents who are deciding which R3 event would be useful. When seen visually, however, it also gives SFWAs an overall directional sense of R3 event offerings, the specific focus of the event offerings, and what type of offerings are in higher demand. One weakness of the current study is that the strategic orientation matrices were constructed relying on the expert opinion of the primary investigators and the R3 professional(s) of the collaborating SFWAs. If the ABCs questions were added to all R3 event evaluations, over time there would be enough data to establish a matrix created from the responses of event attendees rather than on the judgement of R3 professionals. This step is crucial to SFWAs that intend to create progressions from introductory R3 events, to more developed/involved R3 events, to the phase of “continuation without support,” which is the eventual goal of R3 programs.

CONCLUSION

The Outdoor Recreation Adoption Model (ORAM) serves as a vital structure for guiding recruitment, retention, and reactivation (R3) efforts in hunting-related programs. By incorporating the ABC framework—Aptitude, Behavior, and Community— R3-vested organizations can gain a deeper understanding of hunter identity formation. This framework allows R3 initiatives to tailor activities to individual participants, better evaluate program outcomes, and identify areas for improvement. Specifically, the ABCs of hunter identity formation can be used by SFWAs, or any other R3-vested organization, to achieve the following:

1. **Match constituents to suitable R3 events** by measuring the ABCs at the individual level and then making tailored recommendations based on those needs.
2. **Learn which R3 events attract different hunter types** by calculating the average of the ABCs of attendees on pre-event surveys.
3. **Determine the efficacy of R3 events** by measuring the ABCs before and after the R3 event, to ascertain how much the event "moved the needle" for the average attendee.
4. **Design a robust R3 program** by classifying R3 events according to the efficacy of lifting the ABCs, through this effort SFWAs can generate their own strategic orientation matrix. This matrix is designed to identify beneficial 'next steps' to create custom permutations of progressively more advanced R3 experiences.

Through targeted assessments and structured progression, organizations can support hunters from their first experiences to eventual "continuation without support." Ultimately the application of the ORAM, augmented by ABCs, strengthens the broader conservation community by enabling R3-vested organizations to become more efficient at developing Aptitude, broadening Behaviors, and fostering a sense of Community for new and lapsed hunters, ensuring the sustainability of hunting traditions.

APPENDIX A – Assessment Tool (with analysis guidance)

The assessment tool is meant to be used in two similar, but distinct ways: 1) is to evaluate R3 events, and 2) is to evaluate individuals seeking R3 opportunities. To evaluate R3 events, the 10-item battery should be added to *both* the pre-event and post-event evaluations of the R3 effort (below). The questions and response options should be worded exactly as presented to take full advantage of the extensive psychometric testing completed herein. The response options should be coded from '*Not at all*'-1 to '*A great deal*'-5. The average response to the first three items is the Aptitude measure. The average response to the second three items is the Behavior measure. Finally, the average response to the last four items is the Community measure. Cut-off values are subjective, but we suggest labeling events with aggregate values of less than 2.5 as low, 2.5-3.8 as moderate, and values above 3.8 as high.

To evaluate individuals, the process is very similar, but slightly easier as the Aptitude, Behavior, and Community components are added rather than averaged (next page). The score ranges are included on the form, but SFWAs may customize these values per their expertise and judgement. This 10-item battery can be taken as part of a pre-event survey for an R3 event, or it can be taken by an individual who has not yet registered for an event, but is visiting an SFWA office or website to learn how to get involved in outdoor recreation. Once an individual has completed the assessment, and knows if they should seek or consider a particular R3 event that develops the corresponding low-scoring identity factor, they can work with agency staff to be paired with an R3 event that provides an experience commensurate to the individual's needs.

Please indicate how much the following statements describe you, personally.

	Not at all	A little	A moderate amount	A lot	A great deal
I feel like I have the hunting skills that I need.	☐	☐	☐	☐	☐
Hunting is an important part of my identity.	☐	☐	☐	☐	☐
I prioritize hunting over other activities.	☐	☐	☐	☐	☐
In five years, hunting will likely be one of my most important activities.	☐	☐	☐	☐	☐
I regularly read or consume media related to hunting (such as magazines, books, internet, podcasts, YouTube, TikTok, etc.).	☐	☐	☐	☐	☐
I wear clothing or display logos that show my interest in hunting (such as camo gear, hunting logos, hunting groups, etc.).	☐	☐	☐	☐	☐
I feel like I am part of a hunting Community.	☐	☐	☐	☐	☐
I have people in my life that I can go hunting with.	☐	☐	☐	☐	☐
I participate in online or social media communities related to hunting.	☐	☐	☐	☐	☐
My friends and family approve of me hunting.	☐	☐	☐	☐	☐

Please indicate how much the following statements describe you, personally.

	Not at all	A little	A moderate amount	A lot	A great deal
I feel like I have the hunting skills that I need.	1	2	3	4	5
Hunting is an important part of my identity.	1	2	3	4	5
I prioritize hunting over other activities.	1	2	3	4	5
In five years, hunting will likely be one of my most important activities.	1	2	3	4	5
I regularly read or consume media related to hunting (such as magazines, books, internet, podcasts, YouTube, TikTok, etc.).	1	2	3	4	5
I wear clothing or display logos that show my interest in hunting (such as camo gear, hunting logos, hunting groups, etc.).	1	2	3	4	5
I feel like I am part of a hunting Community.	1	2	3	4	5
I have people in my life that I can go hunting with.	1	2	3	4	5
I participate in online or social media communities related to hunting.	1	2	3	4	5
My friends and family approve of me hunting.	1	2	3	4	5

Add these numbers _____ (write the sum here)

Scores:
3-6 = Seek an event that develops Aptitude
7-10 = Consider an event that develops Aptitude
11-15= You may not need an event that develops Aptitude

Add these numbers _____ (write the sum here)

Scores:
3-6 = Seek an event that develops Behavior
7-10 = Consider an event that develops Behavior
11-15= You may not need an event that develops Behavior

Add these numbers _____ (write the sum here)

Scores:
4-8 = Seek an event that develops Community
9-15 = Consider an event that develops Community
16-20= You may not need an event that develops Community

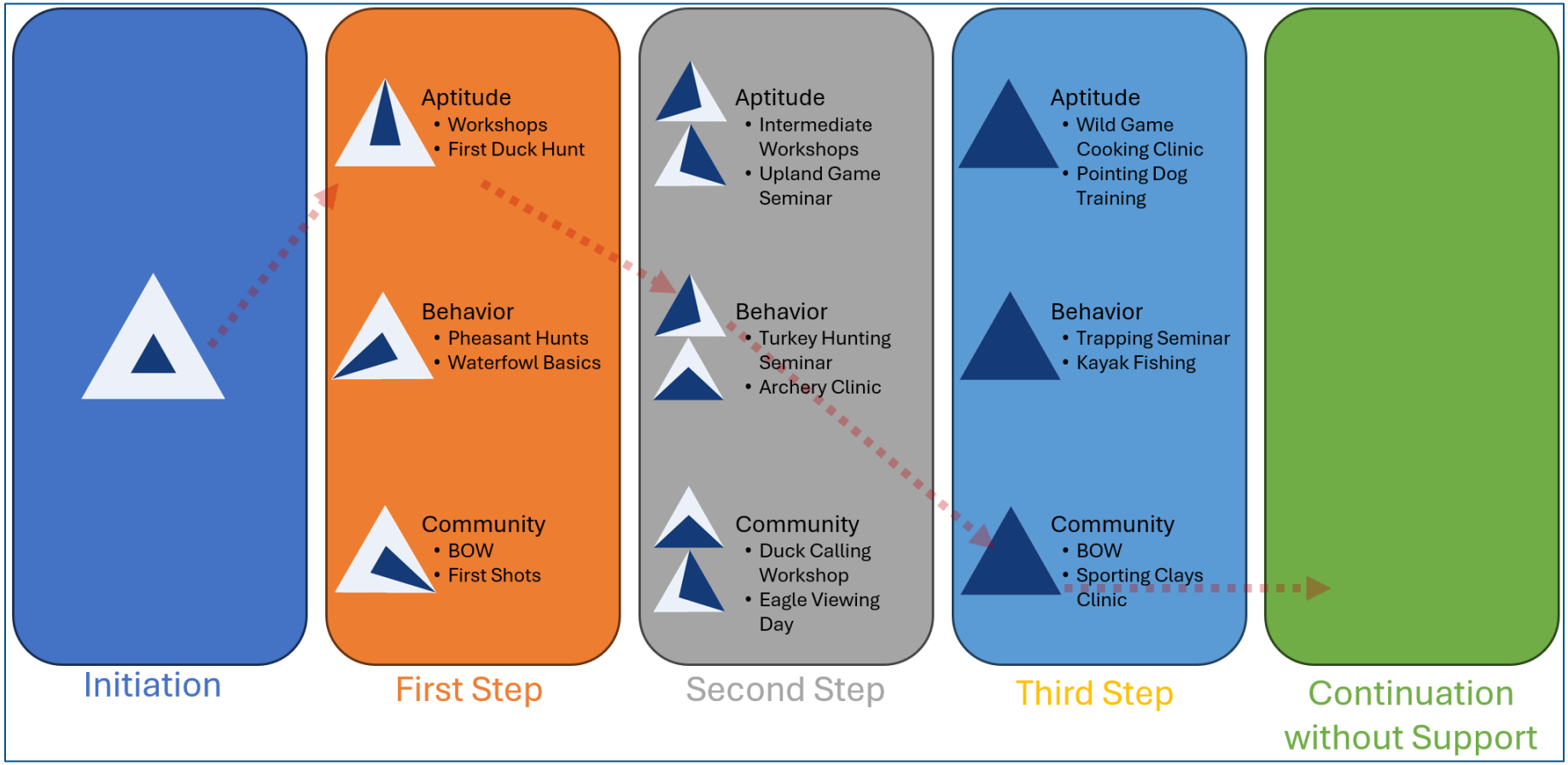


Figure 14. Research indicates repeated exposures over time increase the likelihood of a hunter being retained. This is a hypothetical depiction of R3 events in increasing order of their effect on Aptitude, Behavior, and Community. As a person progresses in their hunting identity, the suggested R3 events may be considered 'next steps'. The dotted path in red is only one of many permutations a new hunter could take in their path to hunter self-identification. However, if after they take the assessment on the previous page, they find they are already high on one, or more, of the identity factors, they may elect to skip to the next step. The ultimate goal of the sequential progression of R3 events is to get the individual to the stage where they can continue without support.

APPENDIX B – Table of Measurements – All Participating Organizations

Table 8. The Aptitude, Behavior, and Community identity factors are computed by taking the arithmetic mean of the first three questions, the next three questions, and the last four questions, respectively, on both the pre-event (grey columns) and post-event surveys (blue columns). To explore what type of hunter was enticed by the different R3 offerings, we used their ABC identity factors from the pre-event measurement. To estimate how effective the R3 event was at changing the ABC identity factors, the pre-event ABC factors were subtracted from the corresponding post-event ABC factors (color coded columns).

**NOTE: The value of the difference does not always equal the difference between the pre-event and post-event measures due to data missingness.*

	Pre-Event Measurement			Post-Event Measurement			Difference		
	Aptitude	Behavior	Community	Aptitude	Behavior	Community	Aptitude	Behavior	Community
AL Collegiate	2.56	2.48	3.05	3.13	2.90	3.45	0.63	0.44	0.56
AL Hunting 101	2.33	2.44	3.04	3.33	2.95	3.61	1.06	0.56	0.67
AL Mentored Hunt	2.55	2.78	2.86	3.56	3.36	3.30	0.76	0.24	0.39
NE Adult	1.67	1.83	2.50	2.33	2.00	2.50	0.67	0.17	0.00
NE Youth	2.17	2.58	3.06	2.67	1.67	3.50	0.50	-0.92	0.44
NE Youth- Archery	3.93	3.87	3.65	3.63	3.60	3.43	-0.30	-0.27	-0.23
NE Youth- Waterfowl	3.07	2.53	3.15	3.40	3.27	4.00	0.33	0.73	0.85
TN Adult hunt	2.16	2.61	2.40	2.79	3.02	2.86	0.81	0.31	0.61
TN Introductory	2.08	2.52	2.42	2.79	2.93	2.92	0.75	0.27	0.31
TN OWN	2.65	2.85	3.18	3.50	4.00	4.31	0.50	1.08	1.13
TN Virtual	2.19	2.86	2.66	3.05	2.90	2.94	0.83	0.33	0.33
TN Youth	2.60	2.75	2.95	3.20	2.99	3.48	0.57	0.29	0.55
UT Annabella	3.63	3.31	3.70	3.91	3.99	3.57	0.20	0.62	-0.22
UT Cedar City	3.05	2.81	3.32	3.41	3.52	2.94	0.00	0.30	-0.53
UT Ogden Bay	2.89	2.98	3.33	3.18	3.57	3.18	0.37	0.52	-0.26
UT Pahvant	3.18	3.03	3.35	3.39	3.77	3.34	-0.03	0.41	-0.28
UT Pine Canyon	2.48	2.62	2.75	3.00	2.97	2.80	0.63	0.50	-0.09

APPENDIX C– References

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APPENDIX D – Contributors

Dr. Loren Chase - Loren is a social scientist and research methodologist with degrees in wildlife biology and human dimensions of wildlife. He has nearly a decade of experience within state wildlife agencies, working as a Human Dimensions Research Coordinator, Senior Economist, and as Manager of Budget & Economic Analysis. He was instrumental in groundbreaking human dimensions research that led to increases in conservation revenues and participation in hunting and fishing. He served as Chair and Vice Chair of the WAFWA HD Committee, Chair of The Wildlife Society HD Working Group, and Director-at-Large of the Arizona Wildlife Federation. He is a peer-review editor for six academic journals and regularly publishes articles in peer-reviewed journals, as well as lay articles regarding people and wildlife. Loren is currently the principal of Chase & Chase Consulting, a research firm with expertise in data mining, statistical analysis, and business intelligence, with an emphasis in wildlife conservation. Notable research work includes the appearance of The Future of Hunting and Fishing project on *NPR*, a social justification of hunting on *NBC*, and the recruitment of hipster hunters published in *The Wall Street Journal*.

Matt Dunfee – Matt is the Director of Special Programs for the Wildlife Management Institute. In his past and current positions with WMI, Matt has served as the Conservation Program Specialist in WMI's Washington D.C. Headquarters where he worked on numerous projects related to North American wildlife conservation, wildlife disease ecology, private lands programs, and hunting heritage. He also serves as the Director of the Chronic Wasting Disease Alliance, the Chair of the North American Wildlife and Natural Resources Conference, Co-Chair of the National Hunting and Shooting Sports Action Plan, and Lead Investigator on projects with NASA's Earth Science Division. In his current roles, Matt serves on numerous professional committees and boards including the AFWA Fish and Wildlife Health Committee, national and regional association R3 Committees, the North American Wildlife and Natural Resources Conference Steering Committee, and the National Academies of Sciences. Following his leadership in developing evaluation theory and toolkits for hunter, angler, and shooter R3 efforts, Matt has delivered over 40 multi-day training and information workshops for state and federal wildlife agency staff and administrators on R3 strategies, program development, evaluation, and best practices. He has led and authored dozens of research projects on R3, Hunter Education, and Conservation Relevancy, and co-authored foundational R3 best practices guidance documents including the Outdoor Recreation Adoption Model, WAFWA R3 Metric Standards, the AFWA Relevancy Roadmap, and the National Hunting and Shooting Sports Action Plan.