

THE PSYCHOLOGY OF EXTREME BIRDERS:  
PARALLELS TO OTHER EXTREME BEHAVIORS, ANOREXIA NERVOSA,  
ADDICTION, AND AUTISM SPECTRUM DISORDER

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## Abstract

Anecdotal accounts and sparse empirical data indicate that extreme birders present with striking characteristics, including an intense interest in birding and the exertion of immense effort directed toward the pursuit. The overvalued and effortful nature of extreme birding appears to lead to the emergence of prominent characteristics that are also evident in individuals who pursue other extreme behaviors such as high-altitude mountain climbing, ultrarunning, and severe calorie restriction. These features include: euphoria, identification with the pursuit, pride, a sense of superiority, and competitiveness related to the pursuit; a concern for the purity of the pursuit; and valuing the pursuit in part because it facilitates predictable judgments, stability, simplicity, and structure. Extreme birding may also be associated with specific benefits and costs. Additionally, anecdotal accounts indicate the presence of facets suggestive of an “addictive” pattern of behavior in some extreme birders. Finally, extreme birders may also have a drive to “systemize,” a feature that is linked to Autism Spectrum Disorder. A total of 400 birders recruited from the Internet completed an online battery of measures. Following exploratory statistical procedures, a score representing degree of birding involvement was generated for each participant. Regression analyses were conducted to assess the extent to which birding involvement predicted the endorsement of a number of items addressing features of extreme birding, with the hypothesis that higher levels of involvement would predict higher scores on these items. Secondary analyses separated participants into three birder groups and compared mean scores on continuous items. The percentages of birders who endorsed each categorical item within these three groups were also calculated and compared. As hypothesized, birding involvement significantly predicted higher scores on the majority of items measuring: birding-related benefits;

physical, financial, and interpersonal costs; features of extreme behaviors such as euphoria, identity, and competitiveness; characteristics that overlap with “addiction” such as a pattern of escalation; and a tendency to “systemize” as measured by the adapted Systemizing Quotient-Revised. The present study is the first to provide empirical support for the presence of these features. These results help advance knowledge of extreme birders and may have implications for populations who pursue other extreme behaviors, including both variants of normal behavior such as ultrarunning and high-altitude mountain climbing and pathological patterns similar to those seen in Anorexia Nervosa and substance abuse.

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The Psychology of Extreme Birders: Parallels to Other Extreme Behaviors, Anorexia Nervosa, Addiction, and Autism Spectrum Disorder

In early April 2007, Russ Haywood made an impulsive decision to travel to Burra, an island that is part of the subarctic archipelago of Scotland. It was late Friday afternoon when the sighting happened:

*[Since] it was getting late now, and a band of snow was approaching from the southwest, I started the long walk back to the car. As I got back to Banna Minn beach I suddenly heard a loud, ringing ‘kii-deee’ call from somewhere overhead that . . . I immediately knew could only be a Killdeer Charadrius vociferus! Looking round frantically I saw . . . a stunning Killdeer! . . . Surely I must be hallucinating? I checked and re-checked but there was no doubting [its] identity. I hurriedly grabbed my camera and took a few record shots, then reached for my video camera and recorded a short sequence . . . I [was] shaking so much with adrenaline! I then left . . . and ran up the hill to get a mobile signal and put out the news of the [Killdeer]. (Haywood, 2009, pp. 75 - 76)*

While the general population may not understand Haywood’s exhilaration at the sight of a Killdeer, a small white and brownish-tan bird that is commonly found on North American lawns, golf courses, and parking lots (Cornell Lab of Ornithology, 2011), the sighting is an important one for birders such as Haywood. The Killdeer is a species rarely found in Great Britain – prior to 2007, only fifty had ever been recorded in the country (Haywood, 2009). For competitive birders who are actively trying to increase the number

of bird species that they see, spotting a rare bird like the Killdeer in Great Britain is a significant event. A focused interest in birding, a sense of euphoria described when seeing a new bird, and the strikingly high value placed on birding are features exemplified in Haywood's reaction to the Killdeer that make extreme birders a fascinating population to study. According to Lee Evans, one of Britain's top competitive birders: "A lot of . . . birding is all about the psychology of birders. You have to get inside the brains of birders and the psyche of them to learn what they're all about" (Leveugle, 2010). Although a handful of studies have explored features of birders, the present study is the first to focus specifically on the psychology of *extreme* birders, including characteristics that distinguish extreme birders from other birders, perceived benefits and costs of extreme birding, hypothesized similarities to other extreme patterns such as high-altitude mountain climbing, ultrarunning, and severe calorie restriction, extreme birders' characterization of birding as an "addiction," and a putative affinity for systems and numbers known as "systemizing," a feature associated with Autism Spectrum Disorder (ASD).

#### *Characteristics that Distinguish Extreme Birders from Casual Birdwatchers*

The pursuit of "extreme birding" refers to tracking down bird species to add to a personal list ("listing"). The terms "competitive birder" or "lister" are often used to describe extreme birding in the United States; the term "twitcher" is commonly used in other English-speaking countries. Birders can compete by increasing their national, state, county, or life lists, or by participating in time-sensitive competitions such as "The Big Year" or a "year list," which involve listing different bird species in a specific country or



continent in a single calendar year. While most birdwatchers casually and infrequently observe birds, extreme birders participate in serious listing that requires them to actively pursue birds across the globe or in defined regions. In order to be a top birder with one of the longest lists, an individual must spend considerable time, money, and energy to travel to distant and remote places – many of which are dangerous and difficult – to track and list different bird species. Additionally, the identification of bird species requires a great deal of skill, particularly as the appearance of the same bird species can vary dramatically as a result of gender, maturation, season, and color variations (e.g., partial albinism). Although research has yet to formally define extreme birding, published accounts of birders converge with Bill Oddie's (1995) informal definition of an extreme birder as an individual who “responds with frenzied activity to news of rarities in his region, and will spend large amounts of money and travel long distances at short notice to see a rarity or new bird.”

While no prior study has investigated features of extreme birders, several research studies have established motivational and behavioral differences between casual and more committed birders. For example, unlike casual birdwatchers, more serious birders are significantly less interested in selecting a location to bird based on the variety of flora and fauna, the availability of complementary activities such as visiting historic sites, or the availability of competing activities such as hunting or fishing (Cole & Scott, 1999). Additionally, committed birders are significantly more interested in settings with greater opportunities to observe birds (Cole & Scott, 1999; Hvengaard, 2002). Skilled and active birders also ascribe more importance to the variety of birds likely to be seen or heard on a trip and are less likely to rate the availability of scenic beauty, alluring places, historic

sites, shops, local crafts and antiques, fishing opportunities, and marine life tours as important when making a birding trip (Scott & Thigpen, 2003). In another study, committed birders were significantly more likely to be motivated by all items on a self-report measure, including seeing new bird species, improving birding skills and abilities, and seeing as many different bird species as possible (Scott, Ditton, Stoll, & Eubanks, 2005). Compared to casual birders, skilled and active birders reported a greater number of previous days that involved birding, could identify more birds by sight and sound, considered birding to be more central to their lifestyle, had been involved in birding for a greater number of years, traveled a greater number of miles to bird, spent more money birding, and had a greater number of birds on their life lists (Scott & Thigpen, 2003). Studies that did not sample from locations that specifically attract more experienced birders found that more than three-quarters of participants were casual or novice birders, indicating that only a small proportion of the birding population can be described as advanced (McFarlane, 1994; Scott & Thigpen, 2003). Similarly, it has been estimated that only about 5% of all Australians who observe birds keep a life list (La Rouche, 2001). Overall, the evidence suggests that more active and experienced birders have clear birding-specific motivations and behaviors that distinguish them from the larger group of casual birders, and seem generally uninterested in planning trips that are not focused on observing new bird species or improving their birding skills.

Published articles investigating birders have utilized varied methods to categorize individuals as serious birders, and no published study to date has focused explicitly on twitchers or extreme birders. For example, Cole and Scott (1999) recruited anyone who was a member of the American Birding Association for their sample of serious birders.

Other researchers have conducted cluster analyses to distinguish different birding specializations. For instance, McFarlane (1994) found that birders could be segmented into four distinct groups – casual, novice, intermediate, and advanced birders – based on differences in past birding experience, economic commitment, and scores on a centrality-to-lifestyle measure. Hvenegaard (2002) also employed a cluster analysis on his sample of birders, and found that the sample sorted into three groups based on economic commitment and centrality-to-lifestyle scores: advanced-active birders, advanced-experienced birders, and novice birders. Scott and Thigpen (2003) separated their sample into casual birders, interested birders, active birders, and skilled birders based on the total number of birding trips in the last 12 months, total number of days birding in the last 12 months, number of birds participants were able to identify by sight, number of birds participants were able to identify by sound, and the importance and pleasure of birding. Another study classified a “committed birder” as a person who, in general:

*. . . is willing to travel on short notice to see a rare bird, who subscribes to a number of birding magazines (such as Birding) that specialize in the identification of birds and places where they may be seen, who leads field trips or seminars for local birding clubs, who keeps a detailed life list as well as a daily journal, who purchases ever-increasing amounts of equipment to aid in attracting, recording, and seeing birds, and for whom birding is a primary outdoor activity (Scott et al., 2005, p. 65).*

In sum, research has categorized competitive birders as “advanced”, “serious”, “committed”, “active”, “skilled”, “advanced-active”, and “advanced-experienced,” and it is unclear how these divergent categories map on to the concept of an “extreme” birder.

### *Benefits of Extreme Birding*

As illustrated in the excerpt from Haywood (2009) at the beginning of this paper, extreme birders often report deriving a significant amount of pleasure from birding. Rushes of adrenaline and euphoria are frequently described in anecdotal accounts written by birders. For instance, acclaimed birder Phoebe Snetsinger described a “feeling of virtual invulnerability once [she] was on the plane and heading towards new places and birds” (Snetsinger, 2003, p. 71). In a 2010 BBC documentary titled, “Twitchers: A Very British Obsession,” birder Chris Craig described birding as “an absolute high. It’s a buzz. It’s an adrenaline buzz. There’s just something about birds. It’s like nothing else” (Leveugle, 2010). After following top American birders Sandy Komito, Al Levantin, and Greg Miller in preparation for his book *The Big Year*, author Mark Obmascik noted an admirable excitement that characterized these extreme birders: “They carried an infectious zest for life, an indestructible sense of optimism that was too seductive for me to resist. I surrendered. I went native. I [became] a birder” (Obmasick, 2004, p. 270). Furthermore, extreme birders often state that the pursuit of birding not only brings them pleasure, but a sense of meaning and personal fulfillment. As Lee Evans stated: “Birding is my fulfillment. The extreme, at any cost, to anybody” (Leveugle, 2010). When birder Garry Bagnell was asked if birding was a form of escapism, he responded: “Yeah, it is. It’s a very . . . weird experience . . . you get transformed into this world . . . of make believe. It’s a very weird sensation, and you just feel so happy. It’s an adventure, it’s a journey, it’s everything” (Leveugle, 2010). Extreme birding has even been described as a form of spirituality: “Birds are my salvation. I can look to them and I can fall back to them. I care far more about birds than I do about people” (Lee Evans in Leveugle, 2010).

Birding also appears to foster a sense of community and trust that has various benefits for birders. As soon as Haywood captured images and video of the Killdeer, he immediately reported the sighting to other birders (Haywood, 2009). Notifying other birders of a rarity is standard protocol for extreme birders: it is considered honorable behavior to do so, and also provides verification that the rare bird species was properly identified (Donnelly, 1994). For these reasons, birders commonly travel with others in groups, which can contribute to an important sense of camaraderie and trust. The significant role that trust plays for birders was also emphasized in Donnelly's (1994) paper, which drew numerous parallels between the importance of trust in the contexts of both birding and mountaineering.

In addition to providing benefits for birders themselves, birding also appears to have a positive impact on the economy and the environment. In 2005, it was estimated that there were more than 125 bird-tour companies worldwide (Sekercioglu, 2002). Given the growing popularity of birding over the last few decades (Connell, 2009), this number has almost certainly increased. The growth of niche tourism has generated significant economic revenue around the globe. For instance, it is estimated that a third of all of Gambia's tourist revenue comes from birding (Stratton, 2004); approximations of the proportion of Costa Rica's tourist income attributable to birding are even greater (Sekercioglu, 2002). Historically, birders have also been some of the strongest proponents of protecting the natural environment, and often support conservation programs with a focus on bird preservation (Stoll, Ditton, & Eubanks, 2006).

### *Costs of Extreme Birding*

Immense effort is necessary to maintain the active lifestyle of an extreme birder, which can lead to discomfort, financial strain, interpersonal turmoil, and sometimes exposure to life-threatening hazards. Despite the euphoria experienced when birders identify new species, some extreme birders describe much of the time spent birding as boring, particularly given the long hours of traveling and waiting that birding requires: “[Twitching is] 95% boredom [and] hanging around, [and] 5% pure mayhem” (birder in Leveugle, 2010). While describing birding, Pete Dunne (1992) likewise noted, “It’s not for fun. There’s nothing fun about dehydrating on some salt-blasted mud flat” (p. 52). When recalling a birding trip in Northwest China and Tibet, acclaimed birder Phoebe Snetsinger wrote, “Living conditions were by and large miserable, activities strenuous to impossible, drives agonizing, seemingly endless and overly-cramped. Fun? Well, sometimes. Successful? Certainly!” (Snetsinger, 2003, p. 216).

In addition to boredom and discomfort, the hazardous locales to which extreme birders travel can expose them to life-threatening dangers. Many extreme birders venture into unstable nations across the planet to list bird species, and some have lost their lives in guerrilla zones (Connell, 2009). Snetsinger encountered various life-threatening dangers before she died in a van accident while birding in Madagascar: she was chased down by armed tribes in different countries, contracted malaria in Gabon, experienced a shipwreck in Indonesia, and was assaulted and raped in Papua New Guinea (Snetsinger, 2003). Other notable birders have also died as a result of this extreme pursuit: Ted Parker was killed in a plane crash in Ecuador, Alan Adams disappeared in the Himalayas, David

Hunt was mauled by a tiger in India, Tim Andrews died at the hands of guerrillas in Peru, and Joe Wood disappeared while birding on Mount Rainier.

The birding equipment and frequent travel required by extreme birders can be financially costly. As birders add more species to their lists, birding becomes increasingly expensive as they must continue to travel in order to find the smaller number of rarer or more elusive birds they have yet to sight. The term birders use for this is CPB, or “cost per bird” (Koeppel, 2005, p. 176). Scott and Thigpen (2003) found that skilled birders in their sample spent significantly more money on birding (with an average annual amount of \$2,193) than casual birders (\$588) or interested birders (\$780). Birder Garry Bagnell recalled spending 600 British pounds (more than \$900) to sight one bird; when prompted about his wife’s reaction to this cost, he replied: “I don’t tell her what they cost. She’d go mad” (Leveugle, 2010). Top birder Richard Koeppel estimated that he had spent more than \$300,000 to accumulate a list of 6,500 bird species (Koeppel, 2005, p. 176). In the words of birder Scott Weidensaul, “serious listing . . . empties bank accounts” (Weidensaul, 2007, p. 277).

Extreme birders also report that birding can contribute to interpersonal difficulties with their spouses and children. Dan Koeppel wrote that birding “requires a specific mindset: singular, focused, and obsessed, often to the point of blotting out anything – family, career, other pastimes – that might slow the quest” (Koeppel, 2005, p. xiv). As an example, consider the role that birding played in Brett Richards’ wedding plans: “[We] got married in March because March is the worst month for birding, so it was the least likely month in which I would have to postpone the wedding because [of] needing to rush off for a bird. We got married in the morning and went birding in the afternoon”

(Leveugle, 2010). As one might imagine, the significant amount of time, energy, and value that extreme birders allocate to birding can be frustrating for their partners. As Mark Cocker noted, “The most problematic relationship for a twitcher is usually your spouse, if you have one at all” (Cocker, 2001, p. 125). Such was the case for Phoebe Snetsinger and Richard Koeppel, both of whom experienced marital problems as a result of extreme birding (Koeppel, 2005; Snetsinger, 2003). While reflecting upon the impact that birding has had on his responsibilities as a father, Garry Bagnell stated: “I think I’m here for the family, but maybe I’m not . . . I suppose the family think that I’m not very reliable . . . I can’t blame [my wife] really . . . she sees what [birding has] done to me” (Leveugle, 2010).

More formal investigation is necessary to further understand the physical, financial, and interpersonal costs that frequently emerge in accounts of extreme birders. It is important to reiterate that, despite these costs, extreme birders report deriving significant benefits from the pursuit, and it would be inappropriate to identify extreme birding as a psychological disorder. That said, competitive birding and other extreme behaviors seem to share certain analogous features with forms of psychopathology, rendering the study of this population interesting from a clinical psychology perspective. Specifically, some aspects of extreme birding appear to overlap with prominent features of Anorexia Nervosa (AN), addiction, and ASD.

### *Birding in the Context of Extreme Behaviors and Anorexia Nervosa*

Anecdotal accounts suggest that the effortful and overvalued nature of extreme birding is associated with a distinctive set of characteristics: euphoria, identifying with



the pursuit, pride, a sense of superiority, competitiveness, a concern for the purity of the pursuit, the perception that the pursuit facilitates predictable judgments, stability, simplicity, and structure, and often the experience of a “moment of inspiration” that initiated engagement in the pursuit. While these features are interesting in their own right, a more intriguing observation is that these characteristics appear to emerge across a diverse group of individuals who engage in a wide range of extreme behaviors (Vitousek, 2010).

Practitioners of extreme behaviors adhere to overvalued and effortful undertakings that most other people are disinclined to pursue. The term “extreme behaviors” – activities that require high levels of persistence and commitment outside the normal bounds of moderation – can apply to a diversity of habits, including physically strenuous activities such as high-altitude mountain climbing, ultrarunning, and long-distance swimming; non-athletic pursuits such as competitive chess and Scrabble®; and even the pursuit of severe calorie restriction in individuals with AN (Vitousek, 2010). Like extreme birding, these pursuits demand exceptional effort. High-altitude mountaineering involves climbing the tallest mountains in the world, and requires the consistent and strained expenditure of energy to complete difficult climbs despite lack of oxygen, physical and mental impairment, severe exhaustion, and life-threatening conditions. Ultrarunners – individuals who regularly run distances longer than a standard marathon and may compete in races of 100 miles or more – persist in the face of intense fatigue, delirium, dehydration, and prolonged stress on their feet, bones, joints, and hearts. Long-distance swimmers participate in lengthy open-water feats, such as swimming the English Channel between England and France or the Kaiwi Channel

between the Hawaiian islands of Molokai and Oahu, persevering despite risks of hypothermia, cardiac arrest, dangerous exhaustion, strong waves and currents, and swimming-induced pulmonary edema. The top competitive chess and Scrabble® players spend a significant portion of their waking hours studying and practicing, which can lead to social isolation, interpersonal challenges, and difficulty keeping a job not related to these pursuits. Individuals with AN fight against the biological impulse to eat in order to maintain a state of semi-starvation despite intense hunger, cold intolerance, swollen joints, fatigue, and risk of starvation-related mortality.

The investigation of features that emerge across a diversity of extreme pursuits in birders may help elucidate whether patterns of overvalued, effortful behavior share elements with disorders such as AN and contribute to a more accurate understanding of both extreme birding and AN. Evidence of these characteristics in AN come from quantitative research (e.g., Gray, 2009; Serpell, Treasure, Teasdale, & Sullivan, 1999; Vitousek, DeViva, Slay, & Manke, 1995), qualitative studies (e.g., Bruch, 1973; Nordbo, Espeset, Gulliksen, Skarderud, & Holte, 2006; Skarderud, 2007), and autobiographical accounts (e.g., De Rossi, 2010; Hornbacher, 1998; MacLeod, 1989; Shelley, 1997). Of particular note is that many of these features appear to distinguish AN from other psychological disorders, and may contribute both to the common characterization of AN as “puzzling” (e.g., Kaye, 2008) and the fact that it has proven “impressively resistant to a wide range of interventions” (Walsh, 2004, p. 6). For example, individuals with alcohol dependence may have trouble imagining their lives without alcohol, but they generally do not fear losing an alcoholic identity (Vitousek, Watson, & Wilson, 1998). While most individuals with narcissistic personality disorder feel that they are superior to others, they

do not derive that sense of superiority from feelings of pride in being narcissistic (Vitousek & Ewald, 1993). Some individuals with bulimia nervosa (BN) have competitive features, but few appear to compete with others to be the “best bulimic.” Most individuals with obsessive-compulsive disorder (OCD) spend a significant amount of time thinking about obsessive thoughts and/or engaging in compulsive behavior, but they do not expend significant effort in order to maintain these obsessions and compulsions. Practitioners working with other clinical populations do not expect to hear their patients characterize their disorder as anorexics commonly do: “My anorexia and I, together we had full control. It made me almost invulnerable. Other people? Who were they? Ignorant, superficial, boring people who understood absolutely nothing” (AN patient cited in Skarderud, 2007, p. 92). Particularly when theorists and clinicians restrict themselves to the conventional boundaries of psychopathology when attempting to understand AN, these characteristics can appear unusual and perplexing. On the other hand, by observing these features in non-clinical groups of individuals who practice forms of overvalued, effortful behavior such as extreme birding, it may be possible to gain a better understanding of AN (Vitousek, 2010).

Although Vitousek (2010) was the first to formally articulate apparent similarities between birding and other extreme behaviors in detail, others have alluded to shared characteristics. As noted earlier, Donnelly (1994) drew parallels between birding and mountaineering when discussing the significant role that trust plays for individuals who engage in these pursuits. Additionally, Scott Weidensaul connected the extreme and costly components of birding to the pursuit of mountaineering:

*How normal is it to abandon your career and family for a year, ricocheting from one end of the continent to the other as you try to rack up a record-breaking list of birds? But then, how normal is it to pay \$60,000 to \$70,000 to risk death climbing Mount Everest? Every pastime, pushed to its logical bounds, becomes peculiar; push it well beyond those limits, and it becomes bizarre (Weidensaul 2007, pp. 277-278).*

Similarly, Pete Dunne compared birding with running: “The fact is, I don’t know what makes birders [do it], any more than I understand why anyone would be driven to run a marathon” (Dunne, 1992, p. 52).

The effort necessary to participate and persist in extreme birding, AN, and other extreme pursuits appears to lead to analogous stereotyped beliefs and behaviors. Similar to reports from extreme birders, practitioners of other extreme behaviors have described their experiences as euphoric, transformative, and spiritual. For example, researchers investigating mental strategies present in climbers attempting Mount Everest concluded their paper with a quote from a participant: “Climbing for me is a highly personal spiritual thing. When I go to the mountains, it is like practicing my religion” (Burke & Orlick, 2003, p. 56). Euphoria appears to frequently accompany weight loss in individuals with AN, such as when Portia De Rossi described reaching her goal weight of 100 pounds as “a crazy feeling of elation” (De Rossi, 2010, p. 190). Quantitative data that support the presence of euphoria in AN come from studies that administered the Concerns About Change Scale (CCS) to individuals with eating, anxiety, and substance use disorders (e.g., Bemis, 1987; Goodyear, 1991; Gray, 2009; Vitousek et al., 1995). The CCS assesses concerns about recovery in individuals with different psychological

disorders, and includes a subscale that examines the hedonic associations with the disorder (Bemis, 1987). Patients with AN endorsed significantly greater concern about the prospect of recovery on most of the CCS subscales compared to those with BN (Gray, 2009; Vitousek et al., 1995), agoraphobia and specific phobias (Bemis, 1987), and OCD (Gray, 2009). Additionally, mean scores obtained from a sample of individuals with substance abuse on the CCS (Goodyear, 1991) were substantially lower than the means obtained from patients with AN in the aforementioned studies. Taken together, these results suggest that individuals with AN are reporting a greater sense of pleasure from their disorder than do people with BN, agoraphobia, specific phobias, OCD, or substance use.

Evidence from both anecdotal accounts and empirical research support the notion that extreme birders identify with the pursuit of birding. In his book, *How to Be a Bad Birdwatcher*, Simon Barnes states: “I don’t go birdwatching. I am birdwatching. Birdwatching is a state of being, not an activity” (Barnes, 2004, pp. 8-9). Phoebe Snetsinger, who began pursuing her record-breaking life list after being diagnosed with cancer, also noted a connection between birding and her sense of identity: “Now, all I had to do was recover from the surgery, and then I could start birding and living (had the two become synonymous?) once more!” (Snetsinger, 2003, p. 86). Empirical data also support the notion that extreme birders are likely to identify with birding. Scott and Thigpen (2003) employed a “centrality to lifestyle” measure that assessed “the extent to which a participant’s lifestyle and social networks are connected to [birding]” (Kim, Scott, & Crompton, 1997, p. 324). The measure consists of nine items that address how central birding is to an individual’s life, including, “If I couldn’t go birding I am not sure

what I would do,” “I find that a lot of my life is organized around birding,” “Others would probably say that I spend too much time birding,” and “I would rather go birding than do most anything else.” As a group, active birders were found to have the highest centrality to lifestyle score, followed by skilled birders, then intermediate birders, and, finally, casual birders; differences between all groups were statistically significant (Scott & Thigpen, 2003). Although many of the birders characterized as “skilled” or “active” in Scott and Thigpen’s study may not qualify as “extreme,” the results are generally consonant with anecdotal information suggesting that extreme birders identify with the pursuit. A tendency to merge one’s sense of self with the activity also appears to be common for practitioners of other extreme behaviors, such as when climber Jim Wickwire described being a mountain climber as “long a part of my identity” (Wickwire, 1998, p. 234). Identification with AN has received support from the aforementioned quantitative work that administered the CCS, which included a subscale that assessed fear of losing personal identity and found significant differences between individuals with AN and those with other psychological disorders (Bemis, 1987; Gray, 2009; Vitousek et al., 1995).

The effortful accomplishments achieved by extreme birders appear to lead to pride and a sense of superiority. For example, the birding community’s employment of the term “robin stoker” – a phrase used to describe individuals who simply enjoy watching birds – implies a sense of in-group pride and superiority. This sentiment has been echoed by birder Mark Cocker: “Our identities are sheltered beneath the umbrella of those tertials<sup>1</sup>. I belong. [Other birders] belong. If you don’t know about tertials, you

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<sup>1</sup> Tertials refer to the feathers on the basal segment of a bird’s wing.

don't belong, and that's the point" (Cocker, 2001, p. 25). A sense of superiority was also evident when Lee Evans, who described himself as "the equivalent of George Michael in the birding world," discussed his disdain for "incompetent" birders (Leveugle, 2010). This sense of pride and superiority was noted by Cox and Orford (2004) in a qualitative study investigating exercise "addicts," who described participants as exhibiting "feelings of greater self-confidence, wellbeing and even superiority over others" (p. 178). One study employing a semi-structured interview found that patients with AN frequently reported pride related to their disorder (Skarderud, 2007). Additionally, a sense of superiority was observed in a qualitative study that asked patients with AN to write letters to their disorder (Serpell et al., 1999), and in numerous quantitative studies that found significant differences between diagnostic groups on items that assessed feeling proud, skillful, or special because of the disorder (Bemis, 1987; Gale, Holliday, Troop, Serpell, & Treasure, 2006; Goodyear, 1991; Gray, 2009; Vitousek et al., 1995), indicating that individuals with AN report feeling pride and superiority to greater levels than those with BN, anxiety disorders, or substance abuse.

The theme of competitiveness is also salient in accounts from extreme birders. Snetsinger, for example, noted that birding "was indeed beginning to become intensively competitive for me" (Snetsinger, 2003, p. 154). As Kenn Kaufman, author of the *Kaufman Field Guide to Birds of North America*, stated: "Keeping a list is a way of keeping score; it turns birding into a competitive sport" (Kaufman, 1997, p. 16). The competitive nature that appears characteristic of the top birders also emerges in practitioners of other extreme behaviors, including high-altitude mountain climbing, ultrarunning, long-distance swimming, and AN. Vitousek and Ewald (1993) have

postulated that perfectionism often drives individuals with AN to set progressively higher standards for themselves in the pursuit of weight loss, consequently leading them to compete to be thinner than an increasingly difficult reference group. Consistent with this supposition is the observation that clients with AN in group therapy exhibit intense competitiveness with one another, which may contribute to the poor recovery rates of this treatment modality (Leung, Waller, & Thomas, 1991).

Consistent with a sense of pride, specialness, and competition is concern for the distinctiveness or purity of the pursuit. The fact that few other people have achieved the accomplishments that extreme birders are pursuing, such as listing thousands of different bird species, appears important to the value that is placed on the pursuit. This theme, which emerges in accounts of practitioners pursuing other extreme behaviors, is evident from the frustration expressed when an extreme pursuit gains popularity. Birder Garry Bagnell noted that, “It’s just a bit of a shame [that] when you [spot a new bird species], you can’t have it all to yourself. It’s not an exclusive club like it used to be . . . it’s now unblocked from many many people” (Leveugle, 2010). Similar sentiments are often expressed by high-altitude mountain climbers who frequently protest the growing popular interest in reaching the top of Mount Everest. David Breashears notes: “A powerful appeal of climbing Everest is that it creates a sense of exceptional and unique accomplishment. But, ironically, with so many people [reaching] the summit, no longer [is it] exceptional or unique” (Breashears, 1999, p. 231). Additionally, the significant amount of time that extreme birders spend working to improve their bird identification skills has led some to place particular value on birding without using field guides or other tools to assist with bird identification: “No one who fancies himself a good [birder]



would be seen dead carrying a field guide. It's a snobbery thing – you are supposed to know” (Barnes, 2004, p. 15). This is congruent with a previous study's finding that, compared to casual birders, active birders were more motivated to gain respect from other birders (Scott et al., 2005). This concern for purity appears to lead birders to place particular importance on the skillful identification of bird species (Gentile, 2009, p. 235), high-altitude mountain climbers to value reaching the top of the summit without the aid of supplemental oxygen (Eguskitza & Huey, 2000), adventure racers to disapprove of individuals who are motivated to race for prize money (e.g., Cooper in Jamison, Moslow-Benway, & Stiver, 2005, p. 77), long-distance swimmers to respect strict rules of open-water racing such as the prohibition of wet suits and flippers (e.g., de Castella, 2007), and individuals with AN to esteem calorie restriction without the bulimic symptoms of bingeing and purging (e.g., Bruch, 1986; Hornbacher, 1998, p. 107).

Extreme birders frequently report an appreciation for the pursuit's ability to facilitate simplicity, predictability, stability, and structure. Sean Dooley explained: “When you identify and list things, [you can] impose order on an otherwise baffling universe. Birding gives people who don't have much control in other aspects of their lives at least some illusion of control” (Dooley, 2005, p. 38). The level of focus required of those participating in extreme behaviors appears to facilitate a welcomed distraction from more complex life challenges, a pervasive theme in anecdotes from extreme birders. Dan Koepfel, the son of extreme birder Richard Koepfel, characterized his father as “a brilliant man whose life didn't turn out the way he wanted [and who] buried the sadness by watching birds [and] tending his log-books and checklists” (Koepfel, 2005, p. xv). Snetsinger's personal accounts reveal that she also appreciated the power of birding to

prevent rumination about her terminal melanoma diagnosis and ongoing marital conflicts: “Seeing and learning about birds . . . became mental and emotional salvation. The preparation and primarily the birding itself, plus the record keeping afterwards, all enabled me essentially to forget the threat to my life (or at least to push it aside) and to immerse myself totally in what I was learning, doing, and seeing” (Snetsinger, 2003, p. 55). Consistent with this notion are results from a quantitative study that found committed birders to be more likely than casual birders to report being motivated by birding in order to get away from the demands of life, to be alone, and to get away from family (Scott et al., 2005), supporting the observation that extreme birders perceive birding as an opportunity to focus their attention away from the more complex or less rewarding challenges of life.

The appreciation for an extreme pursuit’s ability to facilitate simplicity, predictability, stability, and structure has also been described by patients with AN. For instance, Nordbo et al. (2006) found that eleven out of eighteen patients in their qualitative study reported that AN provided stability, structure, and predictability, while nine patients reported that AN facilitated a sense of mastery and self-control. Another study reported that patients with AN generally agreed with statements that described their disorder as safe, dependable, and facilitating control, while patients with BN tended to disagree with these statements (Gale et al., 2006). This information is congruent with Bruch’s experiences with patients with AN, Fairburn’s mention that “in a subgroup of patients there is over-evaluation of control over eating per se” (Fairburn, 2008, p. 134), and the clinical observations of Vitousek and Hollon, who suggest that “the cognitive essence of [AN] may be found in potent and inclusive schemata that reduce ambiguity,

facilitate judgments and predictions, and provide a simple set of premises from which specific rules can be deduced” (Vitousek & Hollon, 1990, p. 191).

Another common theme in accounts from extreme birders is the presence of a specific moment that inspires the individual to initiate the pursuit. Many extreme birders recall a specific moment when their interest in birding was triggered. Birders frequently report vivid memories of a “spark bird,” the bird that first initiated their interest in the pursuit of birding. Other birders have described becoming interested in birding after reading a birding book: “When I was 11, I read an account of birding and got hooked” (Dooley, 2005, p. 14). A “moment of inspiration” is also often identified by extreme climbers: “I was picking unhappily at my existential scabs when an idea came to me, a scheme for righting what was wrong in my life . . . The plan consisted, in its entirety, of climbing a mountain in Alaska called the Devil’s Thumb” (Krakauer, 1996, p.165), and individuals with AN: “I can remember lying worrying . . . one night and then . . . the answer had suddenly hit me. It would be easy. All I had to do was stop eating. [I would become] more confident, more attractive” (patient in Shelley, 1997, p.126).

### *The Perception of Extreme Birding as an “Addiction”*

Extreme birders and practitioners of other extreme behaviors commonly describe their effortful pursuit as an “addiction.” For example, Richard Koeppel reported that listing is, “an addiction, just like any other addiction” (Koeppel, 2006, p. xvii). Similarly, Snetsinger stated that she was happily “addicted” to birding: “Birding is an addiction with me. I rather hope it’s incurable” (Gentile, 2009, p. 20). The depiction of effortful pursuits as a form of addiction also emerges in anecdotes and studies conducted on

practitioners of other extreme behaviors. In fact, these characteristics have led some researchers to propose that running and exercise addiction be considered as psychological disorders (e.g., Steinberg and Sykes, 1985; Veale, 1987; Yates, Leehey, & Shisslak, 1983). Additionally, ongoing debate persists about whether eating disorders should be conceptualized as addictions. Although beyond the scope of the current study, it should be noted that twin studies have failed to find shared transmission of substance use disorders with either AN or BN (Keel, Klump, Miller, McGue, & Iacono, 2005) and that the evidence generally does not support that eating disorders are a form of addiction (Wilson, 2010). Moreover, the lack of physiological withdrawal and the exertion of immense effort by extreme birders distinguish the pursuit from substance use disorders. Nevertheless, some partially overlapping characteristics merit investigation, including a pattern of escalation, functional autonomy, the inability for birding to lead to long-lasting fulfillment, the sacrifice of important activities and social obligations to focus on birding, and continuing to bird despite danger, impairment, or distress.

Extreme birders often report a pattern of escalating difficulty and functional autonomy related to birding. For example, Dan Koepfel described his father as having an uncontrollable pattern of escalation: “When [my father’s] birding became oversized, he said he’d stop. At five thousand. At six thousand. At seven thousand” (Koepfel, 2005, pp. 123, 30). Functional autonomy, which refers to the initial motives of a behavior becoming less important than the behavior itself (Allport, 1937), also emerges in anecdotes of extreme birders. Whatever reasons initially prompted an individual’s in birding, the secondary features that emerge as a result of exerting immense effort into the pursuit (e.g., identity, predictability, pride) may become more central to maintaining the

pursuit than the initial motives for participation. In her biography of Phoebe Snetsinger, for instance, Olivia Gentile observed that listing eventually became more important to Snetsinger than birding itself: “By 1994, all Snetsinger cared about was getting to [her next target number], and any pleasure she got in the process was incidental . . . Increasingly, [she had] lost sight of the reasons she’d gotten into birding in the first place” (Gentile, 2009, pp. 234, 249).

Anecdotal accounts also suggest that extreme birding often involves giving up important activities and social obligations, that extreme birders continue to bird despite danger, impairment, or distress, and that extreme birding may ultimately prove unsuccessful at satisfying the lofty expectations of meaning and fulfillment that birders hope to achieve from the pursuit. As noted earlier, serious birders scored higher on a centrality to lifestyle measure than more casual birdwatchers, including greater endorsement of items such as, “I find that a lot of my life is organized around birding” and “Because of birding, I don’t have much time to spend participating in other leisure activities” (Kim et al., 1997). As noted earlier, some extreme birders have experienced difficulties with their spouses and family members as a result of the time, resources, and energy required by extreme birding. The interpersonal costs, financial strain, discomfort, and danger associated with extreme birding, however, do not generally curb extreme birders from continuing to engage in the pursuit. For instance, shortly after being raped in Papua New Guinea, Snetsinger noted: “we addicts can’t just stop birding because of the risks of some unsavory spots; we just have to learn to minimize them” (Snetsinger, 2003, p. 102). Finally, anecdotal accounts suggest that extreme birding may prove unsuccessful at satisfying the lofty expectations of meaning and fulfillment that birders hope to

achieve from the pursuit. In reference to his father's extreme birding, Dan Koeppel concluded that extreme birding and obsessive behaviors fail to "fill our empty spaces . . . Not for Dad, not for me, and probably not for any of the Big Listers" (Koeppel, 2005, p. 270).

### *The Role of "Systemizing" in Extreme Birding*

Simon Baron-Cohen's construct of "systemizing" refers to a drive to analyze or construct systems defined by specific rules (Baron-Cohen, Richler, Bisarya, Gurunathan, & Wheelwright, 2003). He contrasts systemizing with "empathizing", operationalized as "the drive to identify another person's emotions and thoughts, and to respond to these with an appropriate emotion" (Baron-Cohen et al., 2003, p. 161). Evidence affirms that these orientations tend to "compete," in that individuals with high systemizing scores demonstrate lower levels of empathizing, while those with a high drive to empathize score lower on measures of systemizing (Goldenfeld, Baron-Cohen, & Wheelwright, 2005). Citing findings that women are generally more adept at understanding non-verbal communication and nuanced cues, while males tend to perform better than females in domains such as physics and engineering that favor systemizing, Baron-Cohen and colleagues (2003) predicted sex differences in the tendency to empathize versus systemize. He also proposed that autism and Asperger Syndrome (AS) may represent expressions of what he termed an "extreme male brain." Of particular relevance to the focus of this research, he additionally suggested that a strong drive to systemize could be discerned in pursuits such as birding (Baron-Cohen, 2003).

To examine the role of systemizing and empathizing in females, males, and

individuals with high-functioning autism (HFA) and AS, Baron-Cohen and colleagues (2003) created Systemizing Quotient (SQ) and Empathizing Quotient (EQ) questionnaires and administered these measures to a variety of clinical and non-clinical populations. As predicted, normal male adults scored significantly higher on the SQ than did females, while females scored significantly higher on the EQ compared to males. Additionally, adults with HFA and AS scored significantly higher on the SQ and lower on the EQ than matched normal controls. Scores on the SQ and EQ are also correlated with the selection of certain areas of study: students in the physical sciences scored significantly higher on the SQ than the EQ, while students in the humanities scored higher on the EQ than the SQ (Billington, Baron-Cohen, & Wheelwright, 2007). Thus, a drive to systemize may facilitate a preference for and/or skill in analytical, concrete, rule-based, and detail-oriented pursuits.

Although Baron-Cohen used birding to illustrate one way in which the tendency to systemize may be expressed, no research has been conducted to examine this putative link. Anecdotal evidence from birders is consonant with his observation, expressed in their frequent emphasis on a drive to count and classify and a strong preference for sustaining a single-minded focus. More generally, the number-oriented goals of extreme pursuits (e.g., the number of birds on a list, number of miles completed in a race, number of pounds of body weight lost) may attract and ultimately reinforce individuals with a quantitative orientation. John Liep of the University of Copenhagen described this quantitative orientation in birders: “birders’ obsession with quantification becomes a characteristic part of the habitus of many birders and means their experience of nature takes the form of enumeration” (Liep, 2001, p. 12). The importance of numbers to

extreme birders is also evidenced by the value placed on listing a specified number of bird species. For instance, both North America and Australia have an exclusive “600 Club” for the few birders who have sighted 600 species in their respective region, while both Sweden and Denmark have a “Club 300” (Connell, 2009). Anecdotal accounts also support the significance of numbers, such as when Dan Koeppl described birding as being “all about the numbers” (Koeppl, 2005, p. xiii). Evidence that extreme behaviors attract individuals with a quantitative orientation emerges in other effortful pursuits. For example, climber Louis Reichardt observed that many “serious climbers are scientists, particularly engineers or physicists” (LeBrasseur & Reichardt, 2009). Interestingly, higher rates of ASD have been found in individuals with AN than with matched controls from the general population (Gillberg, Rastam, & Gillberg, 1994), and individuals with AN have been found to have a bias for processing details and patterns at the expense of global configurations and a difficulty in shifting cognitive sets to changing contingencies (Zucker et al., 2007).

Consistent with findings that men are more likely than women to have a drive to “systemize,” many extreme behaviors have a skewed gender ratio that favors males. The overwhelming majority of top birders, chess players, and Scrabble® competitors, for instance, are male. According to annual rankings posted by the American Birding Association, more than 90% of the top 50 American listers within the last several years have been male (American Birding Association, 2011). Research examining gender differences in a birding population have likewise found that male birders reported that they were more skilled at birding, had spent more money on birding equipment, had been involved in birding for a greater number of years, and were more committed to birding



than female birders did (Moore, Scott, & Moore 2008). In another study, 85% of birders participating in the Great Texas Birding Classic, a competitive birding event, were male (Scott, Baker, & Kim, 1999). These results are consistent with the findings from Baron-Cohen's work indicating that males have a greater tendency to systemize than do females. In other words, the fact that there are so few top female birders may be due to females' reduced propensity to sustain a single-minded focus.

On the other hand, it appears that the smaller proportion of females who engage in these extreme pursuits have a similar tendency to systemize as their male counterparts. This seems to have been the case for female birder Phoebe Snetsinger, who had seen more bird species than anyone in history at the time of her death (Snetsinger, 2003). According to her son, Snetsinger had a strong single-minded focus, which may have facilitated her ability to be the top female birder of all time: “[My mother] was a master of focusing her intense energy on whatever chore was at hand ... be it studying, writing notes, birding – even resting” (Snetsinger, 2003, pp. 272-273). AN serves as a striking exception to this prevalent gender imbalance, and it is estimated that over 90% of individuals with AN are female (Crisp & Burns, 1983). The esteem that Western cultures have recently placed on thinness as the ideal female form (Polivy & Herman, 2002) may be the primary reason for the high proportion of females with AN. Thus, in addition to a tendency to “systemize,” public attitudes towards various extreme behaviors may also impact who ultimately pursues them (Takishima, 2012).

### *The Present Study*

While anecdotal sources such as personal accounts and descriptions by observers have provided glimpses into the characteristics of birders, only a few studies have examined this population, and none has specifically focused on extreme birders. The current study was designed to investigate features, attitudes, and behaviors suggested by the descriptive literature on extreme birders and individuals who pursue a variety of other extreme behaviors such as mountaineering, ultrarunning, and AN. The features that were examined include: euphoria, identification, pride, a sense of superiority, and competitiveness related to the pursuit; a concern for the purity of the pursuit; valuing the pursuit in part because it facilitates predictable judgments, stability, simplicity, and structure; and experiencing a moment of inspiration that triggered interest in the pursuit. Additionally, perceived benefits and costs of extreme birding were explored, along with features suggestive of an “addictive” pattern of behavior, concerns about changing the behavior, and levels of systemizing. Specific hypotheses included:

1. Extreme birders would report obtaining significantly more benefit from birding than would non-extreme birders.
2. Extreme birders would endorse significantly more costs as a result of birding than would non-extreme birders.
3. Compared to non-extreme birders, extreme birders would report significantly higher levels of euphoria, identification, pride, a sense of superiority, competitiveness, concern for the purity of birding, and that perception that birding facilitates predictable judgments, stability, simplicity, and structure. Additionally, it was hypothesized that extreme birders would be significantly

more likely than non-extreme birders to report that a moment of inspiration triggered their interest in birding.

4. Compared to non-extreme birders, extreme birders would report significantly higher levels of features suggestive of an “addictive” pattern of behavior related to birding.
5. Extreme birders would report significantly greater concerns about change than non-extreme birders.
6. Extreme birders would report significantly higher levels of systemizing and a single-minded focus than would non-extreme birders. Additionally, it was hypothesized that there would be a greater proportion of male extreme birders than female extreme birders.

## Methods

### *Measures*

Measures administered to participants included standard demographic items, basic birding-related information used in prior research, a previously developed Centrality to Lifestyle Questionnaire, a revised version of the Concerns About Change Scale, the adapted Systemizing Quotient-Revised, and original items created by the current investigators that assess various features of extreme birders. Dr. Kelly Vitousek, an expert on the topics of extreme behaviors and AN, initially identified the constructs of interest that were assessed in the present study. First, the primary investigator generated a large pool of items to reflect these constructs. Items were generally created using a 7-point Likert scale from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*), unless the question called for a categorical response such as *Yes* or *No*. Dr. Vitousek provided feedback about which items should be included, omitted, or modified to best capture these themes.

It should be noted that the original items created for the present study are exploratory in nature, and that there is no logical basis for assuming rational clusters. For example, the item that assesses the impact of birding on self-esteem may not necessarily cluster with the item that assesses the impact of birding on moderating unpleasant mood states. Thus, the original items created for the present study were not analyzed as rational subscales but rather as individual dependent variables. Cronbach's alpha was calculated for each measure adapted from prior research since it was expected that the items on these instruments would be correlated. The results obtained from the original items created for the current investigation should be considered preliminary and may help

refine the development of instruments with established psychometric properties in the future.

Many of the original items in the present study incorporated direct quotes from serious birders. Based on recommendations from Dr. Vitousek, the investigator included excerpts from birders to reduce defensiveness, especially for more sensitive items. Particularly given the hypothesis that extreme birders place exceptionally high value on birding, participants may be reluctant to endorse items that reflect negative aspects of extreme birding. By asking participants if they agree or disagree with sentiments noted by other extreme birders, it was hoped that participants would feel less defensive and respond to the questions more accurately. The investigators also decided to place items that characterized birding in a positive light towards the beginning of the study while adding more sensitive questions towards the end in order to build participants' trust and perhaps reduce the attrition that might have occurred if adverse effects were featured in the initial sections of the survey. As a result, the various items assessing each research question are dispersed throughout the study. For example, the item assessing the extreme behavior feature of "euphoria" is placed towards the beginning, while the two items assessing the extreme behavior feature of "the facilitation of simplicity and structure" are placed towards the end (see Appendix B).

Seven birders served as pilot participants and provided feedback on the measures by answering open-ended questions such as, "Were there any questions that struck you as odd, confusing, or offensive?" and "Would you recommend adding or deleting any questions?" The pilot study was conducted to examine participants' overall impression of the questionnaire, verify that birders would not find the questions confusing or offensive,

and obtain feedback about items aimed at identifying birders as “extreme.” Published anecdotal accounts of serious birders and twitchers have characterized “extreme” birders as individuals who dedicate a significant amount of time and energy to birding, consider birding to be an important component of their lives, organize many aspects of their lives to facilitate birding, are relatively expert at birding, frequently travel to see rare birds, keep lists, and plan to continue adding to their counts and expertise. These descriptors, adapted from narratives of extreme birders and prior literature investigating serious birders, were the initial dimensions considered by the primary investigator to categorize birders as “extreme.” Because no prior study has specifically examined “extreme” birders or twitchers, however, pilot participants were asked to provide feedback about using these items to identify someone as a serious birder by rating each criterion on a scale from 1 (*Not At All Useful*) to 7 (*Extremely Useful*). They were then asked to respond to open-ended questions such as: “How would you categorize someone as a serious birder?” Recommendations from birders in the pilot phase of the project were considered prior to finalizing items for the present study. The email template used to recruit pilot participants and the full set of questions administered to pilot participants are included in Appendices B and D, respectively.

*Demographics.* Participants were asked to provide demographic information including their age, gender, sexual orientation, marital status, place of residence, income, ethnicity, and level of education.

*Basic Birding-Related Information.* Participants were administered standard birding-related questions such as the type of lists that they keep, the number of birds on their lists, the number of days that they have spent engaged in various activities related to

birding, the cost of their birding equipment, and the number of birds that they can identify by sight and sound. Birding-related items that were adapted from prior research with birders include: “Is birding the most important outdoor activity to you?” (Eubanks, Stoll, & Ditton, 2004), “In the past 12 months, approximately how many days have you spent on trips with the specific focus of birding?” (Eubanks et al., 2004), “In the past 12 months, approximately how many days have you spent actively looking at, searching for, and/or chasing down birds?” (Eubanks et al., 2004), “Do you keep a life list?” (Scott et al., 2005), “How many birds do you currently have on your life list?” (McFarlane, 1994), “Are you willing to travel on short notice to see a rare bird?” (Scott et al., 2005), “Approximately how many bird species can you currently identify by sight?” (Lee & Scott, 2004; Scott & Thigpen, 2003), “Approximately how many bird species can you currently identify by sound?” (Lee & Scott, 2004; Scott & Thigpen, 2003), “Thinking about all the days that you spent traveling for any reason in the past year, approximately what percentage of those travel days involved you actively looking at, searching for, and/or chasing down birds?” (Hvengard, 2002), and “What is the total cost of all your birding-related equipment that you currently own in U.S. dollars?” (Eubanks et al., 2004; Hvengard, 2002; McFarlane, 1994; Moore et al., 2008; Scott et al., 2005). Refer to Appendix B for the comprehensive set of birding-related items.

*Centrality to Lifestyle.* A nine-item Centrality to Lifestyle Questionnaire was administered to assess the extent to which an individual’s life is connected to birding (Kim et al., 1997; see Appendix B). The measure consists of nine items that address related indicators, including: “Because of birding, I don’t have time to spend participating in other leisurely activities”, “Most of my friends are in some way connected with

birding”, and “I consider myself to be somewhat expert at birding.” Participants responded to each item on a scale from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Scores on all items were averaged to generate a total score ranging from one to seven. The items on the Centrality to Lifestyle Questionnaire yielded a Cronbach’s alpha of 0.87 in the present study, indicating good internal consistency.

*Benefits of Extreme Birding.* Participants were asked to rate how each of several items describing the potential benefits of birding has contributed to their interest in the pursuit on a scale from 1 (*Not At All*) to 7 (*Extremely*), and then identify the top three items that contribute most to their motivations for birding. Table 1 lists the potential benefits of extreme birding that were presented to participants. In addition, three items were generated to capture the potential benefits of birding in increasing self-esteem, elevating mood, and providing an opportunity to set records (see Table 2).

Table 1. Potential Benefits of Extreme Birding

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Birding keeps me active and healthy
Birding increases my awareness of important conservation issues
Birding exposes me to a beautiful diversity of bird species
Birding exposes me to exciting new locations
Birding is adventurous
Birding adds enjoyment to my life
Birding provides me with new challenges
Birding expands my knowledge
Birding introduces me to new people
Birding brings me closer to my friends
Birding brings me closer to my family
Birding adds a sense of accomplishment to my life
Birding helps me understand myself better

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Table 2. Additional Benefits of Extreme Birding

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Birder Sean Dooley described birding as “the only record that I was . . . actually capable of breaking.” To what extent does this sentiment contribute to your motivations for birding?

Some birders have reported that birding has increased their self-esteem. To what extent has this been true for you?

Some birders have reported that birding has helped to prevent or moderate unpleasant mood states (e.g., depression, anxiety, anger). To what extent has this been true for you?

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*Costs of Extreme Birding.* Participants were asked whether they have experienced a number of potential costs as a result of birding by answering *Yes*, *No*, or *Unsure*. Table 3 lists the potential costs of extreme birding included in this measure.

*12-Item Short-Form Health Survey (SF-12).* The SF-12 is a self-report measure of health-related quality of life that has demonstrated strong psychometric properties (Ware Jr., Kosinski, & Keller, 1996; see Appendix B). The SF-12 contains 12 items that assess physical health, with questions such as, “During the past four weeks, have you accomplished less than you would like as a result of your physical health?”, and mental health, with questions such as “During the past four weeks, have you accomplished less than you would like to as a result of any emotional problems, such as feeling depressed or anxious?” Response options vary by question. The twelve items on the SF-12 yielded a Cronbach’s alpha of 0.81 in the present study, indicating good internal consistency.

*Birding in the Context of Extreme Behaviors.* Questions were generated by the investigator to assess the presence of features hypothesized to emerge in both extreme birders and other populations of extreme behaviors. These items address experiences of euphoria, identification with birding, pride related to birding, a sense of superiority from

Table 3. Potential Costs of Extreme Birding

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Harsh weather conditions
Seasickness
Sprained limb
Broken limb
Serious injury
Risk of death
Tropical parasites or infections
Insect bites
Snake bites
Attack by birds
Attack by any other animal (excluding birds, insects, parasites, and snakes)
Pain from frequent binocular use
“Warbler neck” (stiffness and pain in the neck from frequently looking up)
Death of a friend or loved one
Financial strain
Arguments with a romantic partner
Arguments with your children
Arguments with relatives
Arguments with friends
Difficulty finding a suitable romantic partner
Difficulty spending sufficient time with your romantic partner
Difficulty spending sufficient time with your children
Difficulty spending sufficient time with relatives
Difficulty spending sufficient time with friends
Ending of a serious romantic relationship

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birding accomplishments, competitiveness, the ability for birding to facilitate predictable judgments, stability, simplicity, and structure, a concern for purity related to birding, and a moment of inspiration that initiated interest in birding. Most questions were measured on a scale from 1 (*Not At All*) to 7 (*Extremely*). Table 4 lists the items on the questionnaire that address each of these features. As noted previously, these original items are exploratory in nature, and the findings obtained from these items should be considered preliminary.

*Characteristics of Extreme Birding that Overlap with Addiction.* Questions were generated by the investigator to assess the presence of characteristics reported by extreme

Table 4. Features of Extreme Behaviors in Birders

Extreme Behavior Feature	Questionnaire Item
<u>Euphoria</u>	To what extent do you get a sense of euphoria when you see a new bird species?
<u>Identity</u>	Birder Simon Barnes stated that: “I don’t go birdwatching. I am birdwatching. Birdwatching is a state of being, not an activity.” To what extent do you consider birding to be part of your identity?
<u>Pride</u>	How important is it for you to have respect for your birding skills from other birders? To what extent do you get a sense of pride from your accomplishments as a birder?
<u>Superiority</u>	To what extent do you experience a sense of satisfaction from your ability to identify more bird species than most other people? To what extent do you experience a sense of satisfaction from listing more bird species than most other people?
<u>Competitiveness</u>	To what extent do competitive goals contribute to your interest in birding?
<u>Facilitation of Simplicity and Structure</u>	Birder Sean Dooley stated that: “When you identify and list things, [you can] impose order on an otherwise baffling universe.” To what extent does this apply to you? Author Dan Koeppel stated that: “Most Big Listers [are trying] to outrun their personal demons by chasing after something else.” To what extent is this true for you?
<u>Concern for Purity</u>	In an interview with Mark Obmascik, author of “The Big Year,” he stated that: “I ended up concluding that . . . the Big Year contest was as much about honor and integrity as it was about winning.” To what extent is this true for you and your birding pursuits? To what extent would you feel embarrassed to carry a field guide while birding?
<u>Moment of Inspiration</u>	Do you remember a specific moment in time when you became “hooked” on birding?

birders that overlap with the experience of “addiction.” Most questions were measured on a scale from 1 (*Not At All*) to 7 (*Extremely*). Questions address the experience of birding as an “addiction,” a pattern of escalation, functional autonomy, and the inability for birding to fulfill expectations. Table 5 lists the items on the questionnaire that address each of these features.

*Concerns About Change Scale Revised (CCS-R)*. The Concerns about Change Scale (CCS; Bemis, 1987; Vitousek et al., 1995) is a self-report questionnaire created to indirectly assess motivation for change by asking what individuals feel they would lose by giving up their symptomatic behavior. The items on the CCS were written to apply to various forms of psychopathology, while also addressing the features that may be particularly linked to AN. Table 6 lists the 17 rational subscales included in the expanded measure. A factor analysis conducted by Gray (2009) on an eating disordered sample generated eight factors that overlapped considerably with the rationally-derived subscales. The expanded CCS has also demonstrated internal consistency ( $\alpha=.96$ ) and convergent validity with measures assessing drive for thinness, body dissatisfaction, depression, and anxiety in a sample of individuals with eating disorders (Gray, 2009).

For the current investigation, the CCS was revised to apply more generally to pursuits outside of the field of psychopathology such as birding. Two subscales were deemed irrelevant and/or potentially offensive to a non-psychopathological population and were removed from the revised subscale: Unworthy of Change and Problem Reflects a Deeper Underlying Flaw. Additionally, the term “problem” that appears in some of the items was changed to “pursuit”. For example, the item “This problem is an important part of my identity” was changed to “This pursuit is an important part of my identity.” Since

Table 5. Features of Addiction in Extreme Birders

Addiction Feature	Questionnaire Item(s)
"Addiction"	Birder Phoebe Snetsinger described birding as an "addiction." To what extent do you consider yourself to be "addicted" to birding?
Escalation	<p>To what extent do you find it necessary to increase the number of birds on your list to continue gaining pleasure from birding?</p> <p>After achieving a birding goal, how necessary is it for you to immediately "raise the bar" by setting an even more challenging birding goal?</p> <p>Author Dan Koeppe described his father as a birder who eventually became unable to stop birding: "When [his] birding became oversized, he said he'd stop. At five thousand. At six thousand. At seven thousand." Has this type of escalation pattern been true for you and your birding or listing goals?</p>
Functional Autonomy	Some birders have reported that their birding and listing goals eventually become more important than the pleasure they receive from the activity of birding itself. To what extent is this true for you?
Inability to Fulfill Expectations	Which of the following best describe your experience after achieving your most recent major birding or listing goal?

some items on the instrument may still seem irrelevant to birders, participants were given a preamble prior to beginning the Concern About Change Scale Revised (CCS-R) stating: “The questionnaire on the following page was designed to be used with people from a diversity of pursuits. Thus, you may find that some of the items do not apply to birding” (see Appendix B for the full CCS-R). The items of the CCS-R yielded a Cronbach’s alpha of 0.97, indicating excellent internal consistency.

Table 6. Rational Subscales of the CCS

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Unable to Change
Unworthy of Change
Fear of Risks
Fear of Maturity
Fear of Sexuality
Fear of the Process of Change
Fear of Personal Loss – Accomplishment
Fear of Personal Loss – Hedonic
Fear of Interpersonal Loss
Fear of Peer Group Loss
Problem Provides Personal Identity
Problem Provides Disinhibition
Problem Allows Avoidance of Responsibility
Problem Provides a Means of Coping with Negative Affect
Problem Provides a Means of Goal Attainment
Problem Reflects a Deeper Underlying Flaw
Problem is Not Recognized as Irrational

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*The Systemizing Quotient-Revised (SQ-R)*. The SQ-R is a 75-item self-report questionnaire designed to measure degree of systemizing (Wheelwright et al., 2006). The SQ-R was revised from the original SQ (Baron-Cohen et al., 2003) to include items from both traditionally male and female domains, rather than the male-biased domains that were initially used to generate the SQ (Wheelwright et al., 2006). The items of the SQ-R

are answered on a 4-point Likert scale from “strongly agree” to “strongly disagree,” with higher scores on the SQ-R indicating higher levels of systemizing (see Appendix B). The SQ-R has demonstrated good internal consistency (with a Cronbach’s alpha of .90) on a sample of undergraduate students. Additionally, scores from the SQ-R, in conjunction with those from the EQ, were successful at predicting scores on the Autism Quotient in a sample of undergraduates and adults with ASD (Wheelwright et al., 2006), indicating that the SQ-R is an appropriate measure of systemizing.

Unfortunately, due to an error transposing survey items to an online format for the present study, items were offered on a 5-point Likert scale that included a middle answer option not available in the original measure. In an attempt to correct for this error, responses of this middle item were scored as a half point. Although this error prevents valid comparisons to previously collected norms, the results may still be useful for making comparisons between extreme and non-extreme birders, and between male and female birders. The adapted SQ-R demonstrated good internal consistency with a Cronbach’s alpha of 0.87.

*Single-Minded Focus.* In addition to the adapted SQ-R, participants responded to an item that asked directly about a single-minded focus on a scale from 1 (*Not At All*) to 7 (*Extremely*): “Birder Sean Dooley stated that: ‘The real birder has a single-minded tenacity. That’s why they are . . . so damned good at what they do.’ Compared to other people, to what extent do you have a more single-minded focus?”

### *Participants and Procedures*

Birders with online blogs or websites that offered their contact information were sent an email that briefly described the present study and asked if they would consider participation. Interested recipients could click on a link contained in the email and were taken to a website with the informed consent (see Appendix A). Individuals who agreed to participate were instructed to select “Next” and began a series of online questionnaires. Upon completion of the questionnaires, participants were given the opportunity to send the online survey to other birders who might also be interested in participating, and reviewed a debriefing consent form (see Appendix E).

As noted earlier, seven birders served as pilot participants before the initiation of general recruitment for the main study. Following completion of the online questionnaires, the pilot participants answered a series of questions about their participation. A total of 542 birders who reported their age as 18 years or older started the battery of online questionnaires for the main portion of the project; 400 birders (74% of the sample) completed the study, defined as answering the last item on the final questionnaire.

In view of the exploratory nature of the current investigation, several different analyses were conducted, including linear regression, analysis of variance (ANOVA), and chi-square tests. Although some researchers have criticized the widespread use of parametric tests with Likert scales that are technically ordinal (e.g., Kuzon, Urbanek, & McCabe, 1996), a substantial body of research supports the robustness of parametric tests and their suitability with ordinal data (Norman, 2010). In order to detect a medium effect size, Cohen (1992) notes that regression analyses, ANOVA with three groups, and chi-



square tests with 2 degrees of freedom require sample sizes of 85 participants, 52 participants per group, and 107 participants, respectively. Given the present study's sufficiently large sample size and the advantages of listwise deletion, including its simplicity, ability to be used for any kind of statistical analysis, and robustness against violations of missing at random assumptions among independent variables (Allison, 2001), all data from participants who did not complete the study were removed from the analyses. Participants who completed the study ("Completers") and those who did not ("Non-Completers") did not differ significantly by age ( $t(540) = 0.95, p = .34$ ), gender ( $\chi^2(1) = 2.44, p = .12$ ), annual income ( $U = 15962.50, p = .70$ ), number of birds on their life list ( $t(456) = 1.57, p = .12$ ), or number of birds they are able to identify by sight ( $t(473) = 0.34, p = .73$ ). Participants who completed the study, however, were more likely to report being part or full Caucasian ( $\chi^2(1) = 60.118, p < .001$ ), being born in a predominantly English-speaking country ( $\chi^2(1) = 41.943, p < .001$ ), and achieving a higher level of education ( $U = 20304.00, p = .04$ ), and obtained a higher Centrality to Lifestyle score ( $t(479) = 2.65, p = .01$ ). Although participants were not asked explicitly if English was their primary language, 91% of participants who completed the survey indicated that they were born in a predominantly English-speaking country (i.e., Australia, Canada, Ireland, the United Kingdom, or the United States), while only 68% of participants who did not complete the study reported being born in one of these countries. Since the questions were only offered in English, a lack of proficiency in the English language may explain why a significantly greater proportion of participants born in countries where English is not the predominant language failed to complete the battery of

questionnaires. Given this possibility, listwise deletion of Non-Completers appeared to be an appropriate method to reduce the likelihood of introducing error into the analyses.

Moreover, regression estimates using listwise deletion are unbiased as long as the probability of missing data does not depend on the values of the *dependent* (not independent) variables (Allison, 2001). Thus, binary logistic regressions were conducted to assess whether or not a number of dependent variables presented to participants near the beginning of the study predicted survey completion. With the exception of one item that assesses for pride in birding accomplishments (Wald's  $\chi^2(1) = 6.91, p < .01, OR = 1.28$ ), none of these features significantly predicted study completion, indicating that the results obtained from regression analyses will generally be unbiased. The fact that greater pride in birding accomplishments predicted completion of the study may also be related to the significantly larger percentage of participants from English-speaking countries who completed the study, as Western cultures tend to hold more individualistic values such as pride in one's own achievements (Tracy & Robins, 2007). While the preliminary data support listwise deletion as an appropriate approach to address incomplete data, it is important to note that this approach could introduce bias that may be related to the higher proportion of Caucasian and Western-born participants in the final sample.

The sample of participants who completed the study (235 males, 165 females;  $M_{age} = 40.5, SD = 13.3$ ) consisted of 93.5% Caucasian/White, 2.0% Asian, and 1.0% Latino/Hispanic individuals, with an additional 3.5% identifying as two or more ethnicities. Birders in the present study were also highly educated: 76.3% endorsed having obtained a 4-year college degree or higher. Participants reported first becoming interested in birding at an average age of 20 years ( $SD = 13.2$ ), and indicated that they

have been birding for an average of 20 years ( $SD = 15.1$ ). Participants reported birding an average of 128 days ( $SD = 117.2$ ) in the past year, traveling to an average of 5 countries ( $SD = 8.4$ ) in their lifetime for the purpose of birding, and having an average of 670 birds ( $SD = 776.5$ ) on their life list. 54.3% of the sample reported that they were married, and 69.7% indicated currently being in a romantic relationship. Of these participants, 32.7% noted that they are in a relationship with another birder.

## Results

### *Feedback from Pilot Participants*

Seven birders served as pilot participants prior to initiating general recruitment for the main study. Overall, pilot participants rated the items proposed as criteria for a serious birder as useful. Specifically, the nine items presented to pilot participants received mean scores of usefulness ranging from 5.57 to 6.71 on a scale from 1 (*Not At All Useful*) to 7 (*Extremely Useful*). When birders were asked to respond to open-ended questions asking how they would categorize someone as an extreme birder, however, their responses demonstrated significant variance. For example, while one pilot participant stated that she did not think that “life list numbers and long-distance travel are the keys to serious birding,” other participants recommended using lists as an indicator of serious birding. Given the lack of consensus from pilot participants, the primary investigator decided to conduct several exploratory statistical procedures with the goal of identifying items that best represent the construct of an extreme birder.

### *Exploratory Procedures to Identify Indicators of Extreme Birding*

Several different exploratory approaches were employed to identify indicators of extreme birding, including examination of distributions and means, cluster analyses, and exploratory factor analysis (EFA). Table 7 delineates the various birding-related items that were considered as potential indicators of extreme birding. These questions were intended to assess the effortful and overvalued nature of extreme birding hypothesized to contribute to specific psychological features such as identity, pride, and the facilitation of simplicity and structure. The distribution of each of these items via a histogram was

examined for a possible group of outliers who might represent extreme birders. Distributions tended to be normal, positively skewed, or negatively skewed depending on the nature of the item; no bimodal distributions were observed. For example, the Centrality to Lifestyle score had a normal distribution with a modal and mean score at the approximate middle of the scale, the number of birds on participants' life lists had a positively skewed distribution in which a few outlying participants reported high numbers, and the number of days in the past year involving participants thinking about birding had a negatively skewed distribution with the majority of participants reporting that they had thought about birding on 365 days.

Following visual examination of the distributions of these items, the individual item, "Are you willing to travel five hours on short notice to see a rare bird?" was considered as a method for identifying birders as extreme, given the particularly effortful nature involved in traveling five hours on short notice for the purpose of birding. Although birders who reported a willingness to travel five hours on short notice to see a rare bird (26.8% of the sample) generally had higher scores on other birding-related items, certain exceptions led to reservations about using this item as the sole indicator of birding expertise. For example, participants who responded *Unsure* to traveling five hours on short notice to see a rare bird (23.3% of the sample) reported spending more days birding in the past year ( $M = 147.9$ ,  $SD = 121.3$ ) than participants who responded *Yes* ( $M = 138.6$ ,  $SD = 112.6$ ).

Cluster analyses were also conducted in an attempt to identify an extreme group of participants who exhibited a similar pattern of responding to the birding-related items. Different combinations of the items listed in Table 7 were entered into two-step cluster

Table 7. Potential Indicators of Extreme Birding

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Do you keep a life list?

How many birds do you currently have on your life list?

In the past 12 months, approximately how many days have you spent on trips with the specific focus of birding?

In the past 12 months, approximately how many days have you spent actively looking at, searching for, and/or chasing down birds?

In the past 12 months, approximately how many days have you spent somehow engaged in the activity of birding?

In the past 12 months, approximately how many days involved you thinking about or being conscious of birding-related activities?

Approximately how many bird species can you currently identify by sight?

Approximately how many bird species can you currently identify by sound?

Is birding the most important outdoor activity to you?

Are you actively trying to increase the number of birds on your list(s)?

In your lifetime, approximately how many different countries have you traveled to for birding-related purposes?

Are you willing to travel 1 hour on short notice to see a rare bird?

Are you willing to travel 5 hours on short notice to see a rare bird?

Thinking about all the days that you spent traveling for any reason in the past year, approximately what percentage of those travel days involved you actively looking at, searching for, and/or chasing down birds?

What is the total cost of all your birding-related equipment that you currently own in U.S. dollars?

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Total score from the Centrality to Lifestyle Questionnaire

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analyses that allowed for both continuous and categorical variables using a log-likelihood measure of distance. The primary investigator fixed the number of clusters in the solution from 2 to 20 and examined the most “extreme” clusters that could potentially represent a sample of extreme birders. However, a clear cluster of extreme birders did not emerge from numerous attempts at cluster analyses: while one cluster of birders reported the highest scores on some of these items, another cluster endorsed the highest scores on other items.

Finally, an EFA was conducted to examine the factor structure of the birding-related items noted in Table 7. A true factor analysis method in Mplus version 6 (Muthén & Muthén, 1998-2010) was conducted using geomin rotations, an oblique method of rotation. An oblique, rather than orthogonal, rotation was selected because it was expected that factors would be correlated (Costello & Osborne, 2005). A scree test was generated and examined for the number of eigenvalues above the natural bend point in the graph, which indicated that a three-factor solution would be best. Four items loaded onto the first factor, twelve items onto the second factor, and three items onto the third factor. As all three items that loaded onto the third factor had also loaded onto one of the first two factors, however, the third factor was dropped to allow for a more parsimonious account of the data. A second EFA with two factors was conducted, which yielded results that supported this decision: all items from the two-factor solution loaded in the same pattern that the items in the first two factors of the three-factor solution did. Consistent with previous research conducted on birders (Hvenegaard, 2002), the two retained factors appeared to represent an “Experience” and an “Active” construct. As noted in Table 8, the Experience factor consisted of items such as the number of birds on a participant’s

life list and the number of birds that a participant can identify by sight and sound, while the Active factor included items such as the number of days in the past year that involved birding and willingness to travel five hours on short notice to see a rare bird.

Table 8. Exploratory Factor Analysis with Geomin Rotation Factor Loadings

Loading		Item
Factor 1: “Experience”	Factor 2: “Active”	
<b>.87</b>	-.02	Number of Birds on Life List
<b>.80</b>	.10	Number of Birds Identifiable by Sight
<b>.62</b>	.11	Number of Birds Identifiable by Sound
<b>.61</b>	.03	Number of Countries Visited for Birding
-0.34	<b>.65</b>	Keep a Life List
.21	<b>.45</b>	Days on Birding Trips
.07	<b>.36</b>	Days Involved in the Act of Birding
.01	<b>.51</b>	Days Somehow Engaged in Birding
.05	<b>.47</b>	Days Thinking about Birding
.15	<b>.73</b>	Most Important Outdoor Activity
-0.42	<b>.60</b>	Actively Increasing Lists
-0.16	<b>.63</b>	Willing to Travel 1 Hour for Rare Bird
-0.18	<b>.66</b>	Willing to Travel 5 Hours for Rare Bird
.01	<b>.62</b>	Percent Travel for Birding Purposes
.23	<b>.38</b>	Cost of Birding Equipment
.05	<b>.67</b>	Score on Centrality to Lifestyle Questionnaire

To create a total “Experience” and “Active” score, each of the items within these two factors was z-scored and a mean was calculated. Prior to being z-scored, *Yes* responses were coded as 1, *Unsure* responses were coded as 0, and *No* responses were coded as -1 for all categorical items. For instance, participants who responded *Yes* to the item asking whether or not they would travel one hour on short notice to see a rare bird were measured as being 0.43 standard deviations above the mean, which was added to their Active score, while participants who responded *No* to this item were measured as being 2.90 standard deviations below the mean, which was subtracted from their Active



score. In contrast, participants who responded *Yes* to the item asking whether or not they would travel five hours on short notice to see a rare bird were 1.46 standard deviations above the mean, while those who responded *No* to this item were only 0.91 standard deviations below the mean. Thus, categorical variables were assigned varying weights depending on how frequently participants endorsed the *Yes* versus *No* answer options. After being z-scored, the *Unsure* values for each item were replaced with a value of 0 prior to obtaining a mean for each factor. The final Experience score variable ranged from -0.71 to 7.16 with a mean of 0.01 ( $SD = 0.86$ ), and the Active score variable ranged from -1.73 to 1.56 with a mean of 0.03 ( $SD = 0.53$ ).

As stated earlier, anecdotal accounts describe extreme birders (or “twitchers”) as individuals who dedicate a significant amount of time and energy to birding, consider birding to be an important component of their lives, organize many aspects of their lives to facilitate birding, are relatively expert at birding, frequently travel to see rare birds, keep lists, and plan to continue adding to their counts and expertise. Although aspects of the Experience factor overlap with this conceptualization of an extreme birder, the items that make up the Active factor appear to be a better representation of this construct. While participants with high Experience scores have a greater number of birds on their life lists, can identify more birds by sight and sound, and have traveled to a greater number of countries to bird, these birders might not exhibit many of the effortful and overvalued characteristics of extreme birding endorsed by participants with high Active scores: actively trying to increase the number of birds on their lists, spending a significant amount of days in the past year involved in birding trips and activities, organizing many aspects of their life around birding, being willing to travel on short notice to see a rare

bird, and spending a substantial amount of money on birding equipment. Moreover, the Experience factor is significantly correlated with the number of years that a participant has been birding ( $r(355) = .34, p < .001$ ), while the Active factor is not ( $r(394) = .09, p = .09$ ). The fact that the Active factor is not confounded by the number of years that one has been birding provides further support for its use as a marker of extreme birding.

To test whether or not each of these two factors predicted features that have emerged in anecdotes from extreme birders (e.g., identity, competitiveness, the facilitation of simplicity and structure, characteristics of addiction, single-minded focus), a multiple linear regression was conducted using both the Experience score and the Active score as predictor variables. As noted in Table 9, the Active score yielded statistically significant standardized Beta values for all of the features. In contrast, the Experience score generated statistically significant standardized Beta values for just three of the features, all of which were *negatively* correlated. For instance, higher Experience scores predicted significantly lower endorsement of the question, “To what extent do you find it necessary to increase the number of birds on your list to continue gaining pleasure from birding?”  $\beta = -.16, t(349) = 2.77, p < .01$ .

It should be noted, however, that these findings may be exaggerated by a few outliers with very high Experience scores. After eliminating the four participants with Experience scores greater than three, the Experience score was no longer negatively correlated with any of these features. Additionally, the Experience score significantly predicted endorsement of four of the seventeen tested features: Pride – Respect ( $\beta = .17, t(347) = 3.28, p < .01$ ), Competitiveness ( $\beta = .12, t(345) = 2.31, p = .02$ ), Concern for Purity – Field Guide ( $\beta = .16, t(346) = 2.95, p < .01$ ), and Single-Minded Focus ( $\beta = .11,$

$t(344) = 2.13, p = .03$ ). Despite these positive relationships, the Experience score did not significantly predict endorsement of the majority of the extreme behavior features examined. Moreover, the fact that the four birders with the highest Experience scores attenuated the overall relationship between the Experience factor and the outcome variables raises further doubt about its utility as a measure of extreme birding.

Table 9. Summary of Multiple Linear Regression Analyses Predicting Extreme Behavior

Features

Extreme Behavior Feature	N	Adjusted R <sup>2</sup>	$\beta_{\text{Active}}$	$\beta_{\text{Experience}}$
Euphoria	350	.02**	.18***	-.07
Identity	351	.15***	.39***	.00
Pride – Respect	351	.15***	.35***	.08
Pride – Accomplishments	351	.13***	.40***	-.09
Superiority – Identifying	351	.03**	.18**	-.03
Superiority – Listing	351	.03**	.20**	-.05
Competitiveness	349	.10***	.33***	-.02
Simplicity & Structure – Impose Order	352	.02*	.16**	-.04
Simplicity & Structure – Outrun Demons	350	.04***	.22***	-.13*
Concern for Purity – Honor	351	.11***	.36***	-.05
Concern for Purity – Field Guide	350	.04***	.17**	.08
Addiction	352	.16***	.43***	-.17**
Escalation – Gain Pleasure	350	.03**	.17**	-.16**
Escalation – Raise Bar	352	.11***	.36***	-.10
Escalation – Unable to Stop	351	.07***	.28***	-.04
Functional Autonomy	351	.02**	.17**	-.83
Single-Minded Focus	348	.11***	.33***	.02

Taken together, these results support the primary investigator’s supposition that the Active score serves as a better indicator of extreme birding than the Experience score, and thus all subsequent analyses employed the Active score as the sole predictor variable.

Since six “Completers” did not answer all of the items that make up the Active factor, these participants were removed from the analyses, resulting in a final sample size of 394 participants.

One of the initial goals of the present study was to identify criteria that would distinguish extreme birders from non-extreme birders. The aforementioned exploratory methods outlined above, however, failed to clearly identify a discrete group of extreme birders, which may indicate that birding is better expressed in a linear fashion. The decision to interpret birding as continuous rather than categorical is also consistent with taxometric research conducted on another extreme behavior – AN – which suggests that, unlike BN, the restricting subtype of AN is better expressed as continuous than categorical (Williamson, Gleaves, & Stewart, 2005). Thus, regressions were selected as the primary statistical test to assess the extent that extreme birding predicts a host of benefits, costs, and distinctive features of extreme birders. In view of the original goal of identifying a group of extreme birders, however, it was decided that it would also be informative to conduct secondary analyses comparing the means of the most extreme group of birders (defined as participants with an Active score above 1 standard deviation from the mean) to “mid-range” birders (defined as participants with an Active score ranging from -1 standard deviation to +1 standard deviation) and “low-intensity” birders (defined as participants with an Active score below -1 standard deviation). Means on a number of continuous variables were calculated for each of these three groups and compared via ANOVA, and Tukey’s honestly significant difference (HSD) test was used for post-hoc comparisons. Additionally, the percentage of birders who endorsed each categorical variable within the three birding groups were calculated and compared via

Pearson's chi-square tests. The alpha level was set at .05 for all analyses.

The final group of "extreme birders" consisted of 52 participants who were primarily male (79%), Caucasian (98%), involved in a romantic relationship (64%), born in the United States (77%), have received a college degree or higher (71%), and currently own \$5,000 or more in birding-related equipment (71%). Although the Active score that was utilized to identify extreme birders was not confounded by the number of years birding, the final group of extreme birders still exhibited substantial birding experience: extreme birders reported that, on average, they have been birding for 24 years, have 1,076 birds on their life lists, are able to identify 1,169 birds by sight and 495 birds by sound, and have traveled to 9 different countries to bird. Within the past year, extreme birders reported birding an average of 261 days and being somehow involved in the activity of birding for 345 days. 64% of extreme birders reported that they would travel five hours on short notice to see a rare bird, and 98% reported that they would travel one hour.

### *Benefits of Extreme Birding*

Table 10 presents the adjusted  $R^2$  and standardized Beta values from simple linear regression analyses with the potential benefits of birding (see Table 1 and Table 2) as outcome variables. Consistent with the investigator's hypothesis, extreme birding (operationalized as the Active score) predicted reporting greater benefits from birding for almost every item, with the exception of expanding knowledge,  $\beta = .06$ ,  $t(392) = 1.26$ ,  $p = .21$ , and becoming closer to family,  $\beta = .09$ ,  $t(392) = 1.80$ ,  $p = .07$ . The largest effect sizes were obtained for the benefit of adding a sense of accomplishment to life, adjusted  $R^2 = .12$ ,  $F(1, 392) = 54.85$ ,  $p < .001$ , becoming closer to friends, adjusted  $R^2 = .11$ ,  $F(1,$

391) = 49.82,  $p < .001$ , and increasing self-esteem, adjusted  $R^2 = .11$ ,  $F(1, 392) = 54.37$ ,  $p < .001$ .

Table 10. Summary of Simple Linear Regression Analyses Predicting Benefits of Extreme Birding

Benefit of Birding	N	Adjusted $R^2$	$\beta_{Active}$
Active and Healthy	394	.05	.23***
Conservation Issues	393	.02	.14**
Diversity of Bird Species	394	.05	.22***
New Locations	394	.10	.32***
Adventurous	394	.10	.32***
Adds Enjoyment to Life	394	.05	.24***
Provides New Challenges	393	.08	.29***
Expands Knowledge	393	.00	.06
Introduces New People	394	.09	.31***
Closer to Friends	393	.11	.34***
Closer to Family	393	.01	.09
Sense of Accomplishment	394	.12	.35***
Understand Self Better	393	.06	.24***
Break Records	392	.09	.30***
Increase Self-Esteem	394	.11	.34***
Moderate Unpleasant Moods	393	.05	.22***

Table 11 lists the mean scores from extreme, mid-range, and low-intensity birders and the obtained F-values from ANOVA procedures. The three groups differed significantly for all benefits of birding with the exception of conservation issues,  $F(2, 390) = 2.62$ ,  $p = .07$ , expanding knowledge,  $F(2, 390) = 0.36$ ,  $p = .70$ , and becoming closer to family,  $F(2, 390) = 0.81$ ,  $p = .45$ . The largest F-values obtained were for the benefits of becoming closer to friends,  $F(2, 390) = 18.41$ ,  $p < .001$ , exposure to new locations,  $F(2, 391) = 17.75$ ,  $p < .001$ , and finding birding adventurous,  $F(2, 391) = 17.45$ ,  $p < .001$ , with extreme and mid-range birders reporting that these benefits contribute to their reasons for birding to a significantly greater extent than low-intensity birders.

Table 11. Means and Standard Deviations of Birder Groups on the Benefits of Birding

Benefit of Birding	Extreme <i>n</i> ≈ 52	Mid-Range <i>n</i> ≈ 275	Low-Intensity <i>n</i> ≈ 67	F
Active and Healthy	5.54 <sup>a</sup> (1.43)	5.31 <sup>a</sup> (1.42)	4.67 <sup>b</sup> (1.55)	6.63 <sup>**</sup>
Conservation Issues	5.85 (1.46)	5.79 (1.37)	5.36 (1.69)	2.62
Diversity of Bird Species	6.85 <sup>a</sup> (0.41)	6.65 <sup>a</sup> (0.65)	6.34 <sup>b</sup> (0.94)	8.70 <sup>***</sup>
New Locations	6.52 <sup>a</sup> (0.90)	6.09 <sup>a</sup> (1.25)	5.24 <sup>b</sup> (1.44)	17.75 <sup>***</sup>
Adventurous	6.29 <sup>a</sup> (1.07)	5.95 <sup>a</sup> (1.10)	5.12 <sup>b</sup> (1.53)	17.45 <sup>***</sup>
Adds Enjoyment to Life	6.85 <sup>a</sup> (0.50)	6.72 <sup>a</sup> (0.53)	6.48 <sup>b</sup> (0.73)	7.08 <sup>**</sup>
Provides New Challenges	6.37 <sup>a</sup> (0.99)	6.08 <sup>a</sup> (1.00)	5.53 <sup>b</sup> (1.19)	10.80 <sup>***</sup>
Expands Knowledge	6.38 (0.87)	6.27 (0.90)	6.27 (0.86)	0.36
Introduces New People	5.44 <sup>a</sup> (1.42)	4.96 <sup>a</sup> (1.72)	3.82 <sup>b</sup> (1.77)	16.16 <sup>***</sup>
Closer to Friends	4.27 <sup>a</sup> (1.68)	3.75 <sup>a</sup> (1.82)	2.48 <sup>b</sup> (1.41)	18.41 <sup>***</sup>
Closer to Family	3.15 (1.73)	3.37 (1.77)	3.10 (1.83)	0.81
Sense of Accomplishment	6.21 <sup>a</sup> (1.09)	5.61 <sup>b</sup> (1.29)	4.84 <sup>c</sup> (1.53)	16.89 <sup>***</sup>
Understand Self Better	4.77 <sup>a</sup> (1.57)	4.30 <sup>ab</sup> (1.84)	3.75 <sup>b</sup> (1.92)	4.79 <sup>**</sup>
Break Records	3.42 <sup>a</sup> (2.03)	2.78 <sup>b</sup> (1.77)	1.97 <sup>c</sup> (1.56)	10.21 <sup>***</sup>
Increase Self-Esteem	4.92 <sup>a</sup> (1.45)	4.37 <sup>b</sup> (1.51)	3.43 <sup>c</sup> (1.74)	14.97 <sup>***</sup>
Moderate Unpleasant Mood	5.56 <sup>a</sup> (1.46)	5.21 <sup>a</sup> (1.53)	4.67 <sup>b</sup> (1.32)	5.59 <sup>**</sup>

Additionally, when asked to select the top three benefits that contribute most to their reasons for birding, all three groups of birders ranked receiving enjoyment from birding (selected by 68% of the total sample) and exposure to a diversity of bird species (selected by 59% of the total sample) as two of their top three reasons. In addition, extreme birders and mid-range birders both selected exposure to new locations (selected by 34% of the total sample) as the third top benefit, while low-intensity birders selected expanding knowledge (selected by 34% of the total sample) as the third top benefit.

### *Costs of Extreme Birding*

To evaluate the potential costs of extreme birding, binary logistic regressions were conducted, as illustrated in Table 12. Prior to conducting the logistic regression analyses, *Yes* responses were coded as 1 and *No* responses were coded as 0; participants who responded *Unsure* to an item were excluded from the analyses for that specific variable. Consistent with hypotheses, extreme birding predicted experiencing a number of costs from the pursuit. Significant results were obtained for 21 costs of birding; the 4 exceptions included breaking a limb, Wald's  $\chi^2(1) = 1.81, p = .18, OR = 3.51$ , a serious injury, Wald's  $\chi^2(1) = 3.23, p = .07, OR = 3.46$ , snake bites, Wald's  $\chi^2(1) = 3.51, p = .06, OR = 4.34$ , and arguments with children, Wald's  $\chi^2(1) = 3.70, p = .06, OR = 6.56$ . The largest odds ratios were obtained for experiencing the death of a friend, Wald's  $\chi^2(1) = 7.49, p < .01, OR = 20.61$ , and ending of a serious romantic relationship, Wald's  $\chi^2(1) = 14.93, p < .001, OR = 12.12$ .

Results from chi-square tests comparing the percentage of extreme, mid-range, and low-intensity birders who endorsed experiencing costs from birding are presented in



Table 13. Similar to the results from logistic regression analyses, significant differences were observed for all but 5 of these 25 costs: breaking a limb,  $\chi^2(2) = 1.24, p = .54$ , serious injury,  $\chi^2(2) = 3.57, p = .17$ , snake bites,  $\chi^2(2) = 4.34, p = .11$ , arguments with children,  $\chi^2(2) = 2.24, p = .33$ , and arguments with friends,  $\chi^2(2) = 3.87, p = .05$ . For example, 52% of extreme birders reported experiencing risk of death as a result of birding, compared to 15% of mid-range birders and 5% of low-intensity birders,  $\chi^2(2) = 49.21, p < .001$ . Extreme birders also reported more costs to romantic relationships as a result of birding: 57% of extreme birders reported having arguments with their partner as a result of birding, compared to 37% of mid-range birders and 18% of low-intensity birders,  $\chi^2(2) = 18.73, p < .001$ , and 18% of extreme birders reported ending a serious romantic relationship as a result of birding, compared to 3% of mid-range birders and 2% of low-intensity birders,  $\chi^2(2) = 21.12, p < .001$ . In addition to physical and interpersonal costs, extreme birders also endorsed significantly greater financial costs: 44% of extreme birders reported experiencing financial strain due to birding, in contrast to 29% of mid-range birders and 9% of low-intensity birders,  $\chi^2(2) = 18.31, p < .001$ .

Regression analyses assessing the extent to which birding involvement predicted each of the twelve items on the SF-12 yielded significant results for only one question: “How much of the time during the past 4 weeks did you have a lot of energy?”, with more extreme birders reporting that they experienced greater energy, adjusted  $R^2 = .02$ ,  $F(1, 392) = 8.29, p < .01$ .

Table 12. Summary of Binary Logistic Regression Analyses Predicting Costs of Extreme

Birding

Cost of Birding	N	Wald's $\chi^2$	OR
Harsh Weather	389	27.85***	6.19
Seasickness	384	14.34***	2.42
Sprained Limb	387	21.92***	3.95
Broken Limb	391	1.81	3.51
Serious Injury	389	3.23	3.46
Risk of Death	380	24.34***	5.15
Parasites	385	6.57*	2.15
Insect Bites	393	9.17**	4.85
Snake Bites	390	3.51	4.34
Attack by Birds	386	10.07**	1.97
Attack by Other Animal	387	11.08**	2.86
Binocular Pain	387	18.89***	2.51
Warbler Neck	392	11.53**	2.38
Death of a Friend	388	7.49**	20.61
Financial Strain	387	22.15***	3.40
Arguments with Partner	388	24.17***	3.15
Arguments with Children	384	3.70	2.42
Arguments with Relatives	389	11.12**	2.69
Arguments with Friends	386	7.40**	2.45
Difficulties Finding Partner	379	13.01***	3.57
Insufficient Time with Partner	378	19.81***	4.04
Insufficient Time with Children	384	13.02***	6.56
Insufficient Time with Relatives	383	23.64***	5.79
Insufficient Time with Friends	386	19.48***	4.39
Ending of a Serious Relationship	383	14.93***	12.12

Table 13. Percentage of Birder Groups Endorsing the Costs of Birding

Cost of Birding	Extreme <i>n</i> ≈ 52	Mid-Range <i>n</i> ≈ 275	Low-Intensity <i>n</i> ≈ 67	$\chi^2$
Harsh Weather	100%	95%	70%	48.05***
Seasickness	46%	32%	17%	11.29**
Sprained Limb	44%	19%	11%	21.36***
Broken Limb	2%	2%	0%	1.24
Serious Injury	6%	3%	0%	3.57
Risk of Death	52%	15%	5%	49.21***
Parasites	31%	13%	12%	12.23**
Insect Bites	100%	98%	91%	12.07**
Snake Bites	6%	2%	0%	4.34
Attack by Birds	48%	38%	21%	9.84**
Attack by Other Animal	31%	14%	7%	15.05**
Binocular Pain	65%	46%	24%	20.29***
Warbler Neck	90%	84%	70%	14.11**
Death of a Friend	6%	1%	0%	7.46*
Financial Strain	44%	29%	9%	18.31***
Arguments with Partner	57%	37%	18%	18.73***
Arguments with Children	10%	6%	3%	2.24
Arguments with Relatives	33%	16%	6%	14.97**
Arguments with Friends	21%	13%	6%	5.87
Difficulties Finding Partner	32%	11%	5%	20.72***
Insufficient Time with Partner	37%	17%	8%	17.91***
Insufficient Time with Children	15%	6%	0%	11.33**
Insufficient Time with Relatives	31%	15%	2%	19.83***
Insufficient Time with Friends	31%	16%	2%	18.96***
Ending of a Serious Relationship	18%	3%	2%	21.12***

### *Features of Extreme Behaviors*

Table 14 presents the results from simple linear regression analyses evaluating the extent to which extreme birding is predictive of a host of features that also appear to emerge in practitioners of other extreme behaviors: euphoria, identity, pride, superiority, competitiveness, the facilitation of simplicity and structure, and a concern for the purity of the pursuit. As hypothesized, extreme birding significantly predicted higher scores on all 11 items assessing these features. The largest  $R^2$  values were obtained for identity, adjusted  $R^2 = .18$ ,  $F(1, 391) = 84.46$ ,  $p < .001$ , and pride – respect from other birders, adjusted  $R^2 = .18$ ,  $F(1, 391) = 85.83$ ,  $p < .001$ , with the Active score accounting for approximately 18% of the variability in responses on these two items. Similarly, ANOVA yielded significant differences among the three groups of birders for all of these variables, as noted in Table 15. For example, extreme birders averaged a score of 6.35 on the item evaluating birding as a part of their identity, compared to a mean score of 5.70 for mid-range birders and 4.79 for low-intensity birders,  $F(2, 390) = 20.71$ ,  $p < .001$ .

To test whether extreme birding is linked to having experienced “a moment of inspiration,” another feature that emerges in anecdotes from extreme behaviors, a binary logistic regression was conducted with the item that asked participants: “Do you remember a specific moment in time when you became ‘hooked’ on birding?” As hypothesized, extreme birding significantly predicted endorsing a specific moment in time that participants became “hooked” on birding, Wald’s  $\chi^2(1) = 5.49$ ,  $p = .02$ ,  $OR = 1.63$ . Although 79% of extreme birders reported experiencing a “moment of inspiration” compared to 63% of mid-range birders and 58% of low-intensity birders, chi-square analyses comparing the three groups of birders on this item did not yield significant

results,  $\chi^2(2) = 5.83, p = .05$ .

*Characteristics of Extreme Birding that Overlap with Addiction*

As noted in Table 16, extreme birding predicted characteristics that overlap with features of addiction: experiencing the pursuit as an “addiction,” escalation, and functional autonomy. The largest  $R^2$  value was obtained for the item that asked participants to what extent they consider birding to be an “addiction,” adjusted  $R^2 = .17, F(1, 392) = 78.79, p < .001$ . Similarly, ANOVA tests yielded significant results on all 5 of these items, with low-intensity birders endorsing lower scores than mid-range and extreme birders, as noted in Table 17. Significant results were not obtained on tests assessing the extent to which participants found their birding goals to be as fulfilling as they expected via linear regression, adjusted  $R^2 < .01, F(1, 392) = 2.03, p = .16$ , or

Table 14. Summary of Simple Linear Regression Analyses Predicting Features of Extreme Behaviors

Extreme Behavior Feature	N	Adjusted $R^2$	$\beta_{Active}$
Euphoria	391	.04	.20***
Identity	393	.18	.42***
Pride – Respect	393	.18	.42***
Pride – Accomplishments	393	.16	.40***
Superiority – Identifying	393	.06	.24***
Superiority – Listing	393	.07	.26***
Competitiveness	391	.17	.41***
Simplicity & Structure – Impose Order	394	.04	.21***
Simplicity & Structure – Outrun Demons	392	.04	.22***
Concern for Purity – Honor	393	.11	.34***
Concern for Purity – Field Guide	392	.04	.20***

Table 15. Means and Standard Deviations of Birder Groups on the Features of Extreme Behaviors

Extreme Behavior Feature	Extreme <i>n</i> ≈ 52	Mid-Range <i>n</i> ≈ 275	Low-Intensity <i>n</i> ≈ 67	F
Euphoria	6.19 <sup>a</sup> (0.89)	6.00 <sup>ab</sup> (1.01)	5.71 <sup>b</sup> (1.00)	3.73 <sup>*</sup>
Identity	6.35 <sup>a</sup> (1.00)	5.70 <sup>b</sup> (1.35)	4.79 <sup>c</sup> (1.54)	20.71 <sup>***</sup>
Pride – Respect	5.65 <sup>a</sup> (1.28)	4.91 <sup>b</sup> (1.50)	3.63 <sup>c</sup> (1.80)	28.16 <sup>***</sup>
Pride – Accomplishments	6.23 <sup>a</sup> (0.94)	5.68 <sup>b</sup> (1.06)	4.84 <sup>c</sup> (1.24)	26.52 <sup>***</sup>
Superiority – Identifying	5.06 <sup>a</sup> (1.72)	4.72 <sup>a</sup> (1.57)	4.12 <sup>b</sup> (1.88)	5.32 <sup>**</sup>
Superiority – Listing	4.00 <sup>a</sup> (1.93)	3.56 <sup>ab</sup> (1.79)	3.00 <sup>b</sup> (1.87)	4.59 <sup>*</sup>
Competitiveness	5.04 <sup>a</sup> (1.40)	3.84 <sup>b</sup> (1.68)	2.88 <sup>c</sup> (1.70)	24.55 <sup>***</sup>
Simplicity & Structure – Impose Order	4.19 <sup>a</sup> (1.76)	3.70 <sup>ab</sup> (1.85)	3.36 <sup>b</sup> (1.76)	3.06 <sup>*</sup>
Simplicity & Structure – Outrun Demons	2.92 <sup>a</sup> (2.06)	2.50 <sup>a</sup> (1.70)	1.97 <sup>b</sup> (1.52)	4.64 <sup>*</sup>
Concern for Purity – Honor	6.06 <sup>a</sup> (1.42)	5.40 <sup>b</sup> (1.58)	4.60 <sup>c</sup> (1.71)	12.83 <sup>***</sup>
Concern for Purity – Field Guide	2.40 <sup>a</sup> (1.90)	1.75 <sup>b</sup> (1.29)	1.36 <sup>b</sup> (0.83)	9.06 <sup>***</sup>

Table 16. Summary of Simple Linear Regression Analyses Predicting Characteristics of Addiction

Addiction Feature	N	Adjusted R <sup>2</sup>	$\beta_{\text{Active}}$
Addiction	394	.17	.41 <sup>***</sup>
Escalation – Necessary for Pleasure	392	.05	.23 <sup>***</sup>
Escalation – Raising the Bar	394	.14	.37 <sup>***</sup>
Escalation – Inability to Stop	393	.09	.30 <sup>***</sup>
Functional Autonomy	392	.04	.21 <sup>***</sup>

Table 17. Means and Standard Deviations of Birder Groups on the Characteristics of Addiction

Addiction Feature	Extreme <i>n</i> ≈ 52	Mid-Range <i>n</i> ≈ 275	Low-Intensity <i>n</i> ≈ 67	F
Addiction	5.75 <sup>a</sup> (1.74)	5.11 <sup>b</sup> (1.71)	3.88 <sup>c</sup> (1.55)	20.43 <sup>***</sup>
Escalation – Necessary for Pleasure	4.10 <sup>a</sup> (1.85)	3.78 <sup>a</sup> (1.75)	3.04 <sup>b</sup> (1.69)	6.30 <sup>**</sup>
Escalation – Raising the Bar	4.13 <sup>a</sup> (1.91)	3.62 <sup>a</sup> (1.80)	2.48 <sup>b</sup> (1.65)	14.85 <sup>***</sup>
Escalation – Inability to Stop	2.43 <sup>a</sup> (1.68)	2.07 <sup>a</sup> (1.49)	1.36 <sup>b</sup> (0.67)	9.70 <sup>***</sup>
Functional Autonomy	2.19 <sup>a</sup> (1.47)	2.04 <sup>a</sup> (1.34)	1.47 <sup>b</sup> (1.03)	6.01 <sup>**</sup>

ANOVA,  $F(2, 391) = 0.50, p = .61$ . The majority of participants in all three groups reported that achieving birding goals was as fulfilling as they had expected.

### *Concerns About Change*

Results from simple linear regression analyses with the 15 rational subscales included in the CCS-R are delineated in Table 18. Consistent with the investigator's hypothesis, birders with higher Active scores reported greater concerns about change on all 15 subscales when compared to birders with lower Active scores. The largest  $R^2$  value was obtained for the "Provides Personal Identity" scale, with the Active score accounting for approximately 16% of the variability in responses, adjusted  $R^2 = .16, F(1, 392) = 77.34, p < .001$ . Tests of ANOVA on the CCS-R subscales, as noted in Table 19, paint a similar picture, with significant results being obtained for all but 2 of the 15 subscales: "Fear of Risks,"  $F(2, 391) = 2.62, p = .07$ , and "Fear of Sexuality,"  $F(2, 391) = 2.96, p = .05$ . The highest F-value was obtained for the "Provides Personal Identity" scale,  $F(2, 391) = 28.44, p < .001$ .

### *Systemizing and Single-Minded Focus*

As hypothesized, extreme birding also predicted higher scores of systemizing on the adapted SQ-R, adjusted  $R^2 = .01, F(1, 392) = 5.40, p = .02$ , as well as responses on the original item that asked participants "to what extent do you have a more single-minded focus?", adjusted  $R^2 = .13, F(1, 388) = 57.06, p < .001$ . While this single item also yielded significant results between groups of birders via ANOVA,  $F(2, 387) = 15.80, p < .001$ , this finding was not replicated with the adapted SQ-R,  $F(2, 391) = 2.28, p = .10$ .



Table 18. Summary of Simple Linear Regression Analyses Predicting Concerns About Change

CCSR Subscale	N	Adjusted R <sup>2</sup>	$\beta_{Active}$
Unable to Change	393	.06	.24***
Fear of Risks	393	.03	.19***
Fear of Maturity	393	.04	.21***
Fear of Sexuality	393	.02	.14**
Fear of the Process of Change	393	.04	.20***
Fear of Personal Loss – Accomplishment	393	.12	.34***
Fear of Personal Loss – Hedonic	393	.13	.37***
Fear of Interpersonal Loss	393	.04	.20***
Fear of Peer Group Loss	393	.07	.27***
Provides Personal Identity	393	.16	.41***
Provides Disinhibition	393	.05	.24***
Allows Avoidance of Responsibility	393	.03	.18***
Means of Coping with Negative Affect	393	.03	.18***
Means of Goal Attainment	393	.12	.35***
Not Recognized as Irrational	393	.05	.22***
<b>TOTAL SCALE</b>	393	.12	.35***

It was also hypothesized that there would be a significantly smaller percentage of women in the extreme birder group than in the non-extreme groups. As expected, females represented only 21% of the extreme birder group, compared to 41% of the mid-range birder group and 57% of the low-intensity birder group,  $\chi^2(2) = 15.29, p < .001$ . Male and female extreme birders did not differ on rates of systemizing,  $t(50) = 0.73, p = .47$ , or a single-minded focus,  $t(48) = 0.32, p = .75$ . Despite the greater proportion of male extreme birders, male and female participants in the total sample reported similar rates of systemizing,  $t(392) = 1.35, p = .18$  and a single-minded focus,  $t(388) = 0.61, p = .08$ . Upon further review of the results, it was noted that, while female extreme birders had a higher (albeit non-significant) mean score on systemizing than male extreme birders, female low-intensity birders had a lower (non-significant) mean score than male low-

Table 19. Means and Standard Deviations of Birder Groups on Concerns About Change

CCSR Subscale	Extreme <i>n</i> = 52	Mid-Range <i>n</i> = 275	Low-Intensity <i>n</i> = 67	F
Unable to Change	9.65 <sup>a</sup> (5.09)	8.55 <sup>a</sup> (3.95)	7.28 <sup>b</sup> (2.55)	5.48 <sup>**</sup>
Fear of Risks	8.25 (3.06)	7.75 (2.91)	7.09 (2.07)	2.62
Fear of Maturity	9.50 <sup>a</sup> (3.15)	8.73 <sup>a</sup> (3.53)	7.64 <sup>b</sup> (2.58)	4.83 <sup>**</sup>
Fear of Sexuality	7.06 <sup>a</sup> (1.91)	6.50 <sup>b</sup> (1.48)	6.46 <sup>ab</sup> (1.63)	2.96
Fear of the Process of Change	10.37 <sup>a</sup> (6.01)	9.20 <sup>ab</sup> (4.79)	7.79 <sup>b</sup> (3.59)	4.37 <sup>*</sup>
Fear of Personal Loss – Accomplishment	13.83 <sup>a</sup> (5.19)	11.56 <sup>b</sup> (4.74)	8.87 <sup>c</sup> (3.07)	17.82 <sup>***</sup>
Fear of Personal Loss – Hedonic	19.35 <sup>a</sup> (5.77)	16.82 <sup>b</sup> (5.41)	13.24 <sup>c</sup> (4.01)	21.04 <sup>***</sup>
Fear of Interpersonal Loss	7.63 <sup>a</sup> (2.52)	6.98 <sup>ab</sup> (2.00)	6.57 <sup>b</sup> (1.85)	3.99 <sup>*</sup>
Fear of Peer Group Loss	8.75 <sup>a</sup> (3.37)	7.97 <sup>a</sup> (3.24)	6.64 <sup>b</sup> (1.67)	7.74 <sup>*</sup>
Provides Personal Identity	20.08 <sup>a</sup> (5.92)	17.27 <sup>b</sup> (5.34)	13.06 <sup>c</sup> (4.00)	28.44 <sup>***</sup>
Provides Disinhibition	9.69 <sup>a</sup> (3.60)	8.77 <sup>a</sup> (3.65)	7.48 <sup>b</sup> (2.20)	6.44 <sup>**</sup>
Allows Avoidance of Responsibility	8.67 <sup>a</sup> (3.15)	7.81 <sup>ab</sup> (3.07)	7.10 <sup>b</sup> (2.76)	3.92 <sup>*</sup>
Means of Coping with Negative Affect	11.52 <sup>a</sup> (5.72)	10.81 <sup>a</sup> (5.22)	9.13 <sup>b</sup> (4.30)	3.76 <sup>*</sup>
Means of Goal Attainment	16.33 <sup>a</sup> (5.87)	12.59 <sup>b</sup> (4.91)	10.07 <sup>c</sup> (4.40)	23.25 <sup>***</sup>
Not Recognized as Irrational	19.90 <sup>a</sup> (5.15)	19.84 <sup>a</sup> (4.80)	17.07 <sup>b</sup> (4.53)	9.31 <sup>***</sup>
<b>TOTAL SCALE</b>	180.58 <sup>a</sup> (47.54)	161.14 <sup>b</sup> (44.67)	135.51 <sup>c</sup> (32.09)	16.71 <sup>***</sup>

intensity birders. Thus, a post-hoc regression analysis was conducted to test for a Gender  $\times$  Systemizing interaction, which yielded significant results,  $F(1, 391) = 6067.24, p < .001$ . Somewhat incongruent with these results, regression analysis found a significant Gender  $\times$  Single-Minded Focus interaction in the opposite direction, with male extreme birders endorsing a greater single-minded focus than female extreme birders, and vice versa for low-intensity birders,  $F(1, 391) = 4523.81, p < .001$ .

## Discussion

Research exploring characteristics of birders is sparse, and no study prior to the present investigation has focused on extreme birders. A substantial body of literature consisting of memoirs, biographies, documentaries, and Internet sources informed hypotheses that extreme birders present with a number of striking features to a greater extent than non-extreme birders. Although these features are apparent in published accounts from extreme birders, the absence of empirical investigation with a representative sample of birders leaves open the possibility that these subjective sources do not represent the experiences of this population. For example, the hypothesized costs and benefits of extreme birding may be more pronounced in the birders who choose to write about their experiences. Additionally, confirmation bias may have contributed to the selective identification of corroborating evidence and an overestimation of these patterns. The present study was the first to empirically test these specific hypotheses by recruiting participants from birding websites on the Internet. The demographic data collected from participants converge with information from anecdotal accounts describing birders as predominantly educated Caucasian males with varying levels of birding involvement, suggesting that a representative sample of birders was obtained. Demographic data also indicate that the recruitment methods employed adequately enlisted a substantial number of high-end birders. As a result, it is likely that the present sample is more skewed in the extreme direction than Internet-using birders as a whole.

### *Categorizing Birders as “Extreme”*

The lack of consensus from pilot participants on what constitutes a serious birder led to a data-driven, rather than purely rational, approach to categorizing birders as “extreme.” Unlike prior studies that have clustered birders into distinct groups, cluster analyses and other exploratory statistical approaches failed to identify a clear group of extreme birders in the present study. As the current investigation sought to recruit a wide range of birders including a number who might be considered extreme, these results suggest that birding may be better represented as continuous rather than dimensional. As a result, regression analyses were utilized as the primary statistical approach. However, since taxometric tests were not conducted due to insufficient sample size, definite conclusions regarding the continuous nature of birding cannot be made. Consistent with cluster analyses from a prior study investigating birders (Hvenegaard, 2002), results of an EFA found that items assessing birding involvement load on an “Experience” and an “Active” factor. Both rational and empirical evaluations of the items that make up these two factors indicated that the Active factor better depicted the characterization of extreme birders described in anecdotal accounts. Thus, a combination of the different items that loaded onto this factor was employed to define extreme birding. These effortful and valued components of the pursuit included items such as the amount of money spent on birding equipment, the number of days in the past year spent birding, and willingness to travel on short notice to see a rare bird.

As one of the initial goals of the present study was to identify an “extreme” group of birders, participants with Active scores one standard deviation above the mean were placed into an “extreme” group for secondary analyses. Given the artificial nature of

using cut-off points, it is important to note that this group of “extreme” birders may be either overly inclusive (by including a number of birders who should not be categorized as extreme) or overly exclusive (by excluding a number of birders who should be categorized as extreme). Regression analyses suggest that, as a birder becomes more extreme, he or she is more likely to endorse certain features and experiences. Thus, it is hypothesized that birders with Active scores two standard deviations above the mean would represent a still more “extreme” group and endorse the features examined to an even greater extent than the current group of “extreme” birders. Due to insufficient sample size, however, analyses using this conservative approach of classifying extreme birders could not be conducted. Data from the 52 birders with Active scores greater than one standard deviation above the mean do appear to converge with the behaviors noted in anecdotal accounts and represent a focused group of birders: these participants reported, on average, having more than 1,000 birds on their life list, being able to identify more than 1,000 birds by sight, and birding more than 250 days in the past year. It should also be noted that the labels of “mid-range” and “low-intensity” are similarly based on standard deviation cut-off points that are relative to the other participants in the sample, and thus these labels may be overestimating or underestimating the behaviors and experiences of a “mid-range” or “low-intensity” birder.

### *Findings in Relation to Hypotheses*

Results from regression analyses supported the present study’s hypotheses: as birders reported greater involvement in birding, they endorsed greater benefits from birding, costs related to birding, extreme behavior features, characteristics that overlap

with addiction, concerns about change, and a greater disposition to systemize. Overall, similar results were obtained when conducting ANOVA and chi-square tests after separating participants into three birder groups, with the extreme birder group presenting with higher mean scores and percentages than the mid-range birder group, who obtained higher mean scores and percentages than the low-intensity birder group. While the extreme birder group almost invariably endorsed higher scores on the dependent variables than the mid-range birder group, it should be noted that post-hoc tests more commonly revealed statistical significance between extreme birders and low-intensity birders, supporting the supposition that birding may be better represented as continuous rather than dimensional. Additionally, separating the total sample into three smaller groups with varying sample sizes resulted in a loss of statistical power, which may explain the attenuated results obtained in the mean comparison and chi-square analyses.

Taken together, the findings of the present study suggest that the patterns observed in anecdotal accounts from extreme birders are not a result of confirmatory bias or an inaccurate representation of this population, but rather reflect the reported experiences of this group. In some respects, it makes intuitive sense that individuals who expend more effort and place greater value on the pursuit of birding will tend to be more likely to endorse these features. On the other hand, it is likely that many of the previously cited quotes from extreme birders indicating these features would come as a surprise to the general public. While many people might expect serious birders to report receiving enjoyment from the pursuit of birding, they might not anticipate birders' experience of euphoria when seeing a new bird species, such as when Chris Craig described birding as "an absolute high . . . an adrenaline buzz" (Leveugle, 2010). Those unfamiliar with

birding might also be surprised to find out that, as a result of birding, 57% of extreme birders report having experienced arguments with their romantic partner, 52% a risk of death, 44% financial strain, 31% tropical parasites or infections, 31% insufficient time with friends and relatives, 18% the end of a serious romantic relationship, and 6% the death of a friend. Similarly, it is likely that many of the features endorsed by extreme birders in the present study are not intuitive to the general population, including participants' agreement with items assessing the extent that birding helps them impose order on life, is a part of their identity, contributes to a concern for the honor and integrity of the pursuit, is experienced as an "addiction," and leads to a pattern of escalation that is difficult to stop.

The hypothesis that the public would be surprised by these results is not pure speculation: data from a recent study that asked undergraduate students about their attitudes towards a number of extreme behaviors, including competitive birding and high-altitude mountain climbing, lends support to this supposition (Takishima, 2012). While high-altitude mountain climbing was rated as moderately costly and highly difficult, impressive, and leading to positive gains, competitive birding was rated as low on the cost scale and moderate on the difficult, impressive, and positive gains scales.

Participants in this study were also provided with one of two information sets describing the physical risks or psychological vulnerabilities of high-altitude mountain climbing. Exposure to either script resulted in increased ratings of the physical, emotional, and interpersonal costs of the pursuit as well as an increase in the degree of psychopathology attributed to the pursuit. Although not yet tested, it would be reasonable to hypothesize that a summary of the results from the present study delineating the



experienced costs and psychological features of extreme birders would similarly lead individuals to view competitive birding as a more costly pursuit than they had originally supposed.

Despite preliminary evidence from Takishima's (2012) study suggesting that the general public is unaware of the potential costs and degree of effort that serious birding entails, these features are prominent throughout personal accounts by extreme birders and will likely come as less of a revelation to birders themselves. Analogous profiles emerge when reviewing accounts from a host of other extreme behaviors, including high-altitude mountain climbing, ultrarunning, long-distance swimming, deep-cave exploration, and competitive chess and Scrabble®. As anticipated, quantitative results from extreme birders on the questionnaires included in the present study converged with hypotheses derived from anecdotal accounts from extreme birders. In view of these findings, it would be reasonable to speculate that the analogous features highlighted in personal accounts from practitioners of other extreme behaviors would also emerge in representative empirical investigations of those populations. As the present study is the first to explore these features in an extreme behavior population (with the exception of AN), future research with other extreme behavior populations is clearly necessary before formulating more global conclusions about practitioners of extreme behaviors.

To help explain the putative connection between extreme birding, AN, and other extreme patterns, it is proposed that there is a cyclical relationship between the overvalued nature of these pursuits and the effortful behavior required to sustain them. In other words, valuing the pursuit reinforces effortful behavior, while effortful behavior in turn reinforces the value placed onto the pursuit. Consistent with cognitive dissonance

theory and the notion that the over evaluation of body shape and weight is the “core psychopathology” of the eating disorders (Fairburn, 2008), it is suggested that the more value an individual attaches to a pursuit, the more likely that individual will be to engage in the effortful behavior required to maintain the pursuit. Additionally, it is proposed that the energy and dedication required to maintain effortful pursuits consequently increases the value that an individual assigns to the pursuit. Cognitive dissonance theory (Festinger, 1957) would predict that effortful undertakings such as severe calorie restriction or climbing the tallest mountains on the planet would create dissonance in participating individuals who do not place high value on these pursuits. Thus, in order to persist in extreme calorie restriction or high-altitude mountain climbing, an individual must adjust his or her beliefs accordingly to avoid dissonance. For example, high-altitude mountaineers and individuals with AN who do not consider climbing and calorie restriction, respectively, to be central to their identity may struggle to justify the dangerous risks and physical strain necessary to successfully reach the highest summits or maintain a severely low body weight. Likewise, as birders increase their involvement in birding to extreme levels that entail greater risk of serious physical, financial, and interpersonal costs, they will be more likely to strengthen features such as identity, pride, and competitiveness that help facilitate the maintenance of this pursuit. Additional research addressing this proposed cyclical relationship in competitive birders and other extreme behavior populations is warranted.

As individuals increase the value they assign to a pursuit, it also appears likely that they will report more concern about the prospect of giving up that pursuit, a notion that is supported by the results from birders on the CCS-R. It should be noted that

comparisons between birders on the CCS-R and previously collected data from individuals with psychological disorders on the expanded version of the CCS (Gray, 2009) are limited by the divergent language and context of these two measures: asking individuals with a diagnosed psychological disorder to rate their concerns about giving up their stigmatized “problem” is likely to generate different responses than asking individuals pursuing a socially sanctioned activity to rate their hypothetical concerns about giving up their “pursuit.” As a result, certain rational subscales, such as “Unable to Change” and “Fear of the Process of Change,” would be expected to be more relevant for participants in treatment for a psychological disorder than for individuals pursuing an extreme behavior. This trend is evident when comparing the results from the present study noted in Table 19 to the data reported by Gray (2009): for most of the rational subscales, all three psychopathology groups scored higher than the three birder groups, or vice versa. That said, serious birders and individuals with AN scored higher on some subscales than did less intense birders, individuals with BN, and individuals with OCD. For instance, extreme birders and mid-range birders reported greater concern on the “Provides Personal Identity” subscale than individuals with AN, while individuals with AN reported greater concern than low-intensity birders, individuals with BN, and individuals with OCD. As another example, extreme birders reported greater concern on the “Provides a Means of Goal Attainment” subscale than individuals with AN, while individuals with AN reported greater concern than mid-range birders, low-intensity birders, individuals with BN, and individuals with OCD. To reiterate, these comparisons only provide a limited and preliminary suggestion of the overlapping concerns across these populations. Taken together, however, these results are consistent with the

prediction that, as individuals exert more effort and attach more value to a pursuit, they will have more concerns about giving up that pursuit. This supposition may explain the greater concerns about change reported by more extreme birders. Additionally, the elevated concerns about change endorsed by individuals with AN relative to those with BN or OCD is consistent with evidence suggesting that individuals with AN expend more effort and assign more value to their disorder than do individuals with other psychological disorders. Further research is needed to compare concerns about change more directly between birders and other groups.

It is important to restate that these features have contributed to the reputation of AN as a puzzling psychological disorder that is difficult to treat. It is not uncommon for practitioners, particularly those who are unfamiliar with this population, to be perplexed when clients with AN describe their disorder as “my very existence . . . I needed Anorexia to live” (Patient in Shelley, 1997, pp. 12, 14). Indeed, it is easy to understand why many would find the assertion that self-starvation is necessary for survival to be counterintuitive. It is also expected that many readers will be surprised (albeit to a lesser extent) to read quotes from extreme birders describing the pursuit as “my fulfillment” (Leveugle, 2010) or as “mental and emotional salvation” (Snetsinger, 2003, p. 55). On the other hand, there seems to be something more intuitive about climbers reporting that “Climbing for me is a highly personal spiritual thing” (Burke & Orlick, 2003, p. 56) or ultrarunners stating that they value “the primal, unadorned simplicity of running” (Heinrich, 2001, p. 9).

Takishima (2012) proposed possible explanations for the disparate attitudes towards AN versus more socially valued extreme pursuits such as high-altitude mountain

climbing and ultrarunning. Specifically, the general public appears to be aware of the serious costs associated with AN. Additionally, the well-known fact that AN is a psychological disorder may make the valuing of extreme thinness (at least in the context of AN) politically incorrect. In contrast, the likely ignorance of the costs of other extreme pursuits paired with their heroic depiction in popular literature and the media, particularly for renowned athletic pursuits such as running and climbing (e.g., Coffey, 2003), has likely contributed to positive attitudes towards these pursuits (Takishima, 2012). Consistent with Takishima's conjectures, both high-altitude mountain climbing and ultrarunning were rated by undergraduates as more impressive and valued than competitive birding, which was rated as higher on these two scales than AN. Moreover, providing participants with information about either the physical risks of high-altitude mountain climbing or the psychological vulnerabilities reported by some extreme mountaineers led to more negative attitudes towards high-altitude mountain climbing.

When considering the costs associated with extreme pursuits, the evidence indicating that individuals with AN value the pursuit of thinness to an extent comparable to the investment shown by individuals who pursue other extreme behaviors, the partially parallel presentations of these diverse populations, and the aforementioned hypothesis of a cyclical relationship between effortful behavior and accompanying psychological mechanisms, many of the "puzzling" characteristics of AN become easier to understand. Vitousek (2004) noted that: "Patterns that appear mysterious and pathological in the context of AN can be seen as sensible, even admirable, in the service of goals that observers understand and endorse" (p. 227). The striking features of AN make sense in this context. In a way, it would be more puzzling to encounter an individual who is

successful at pursuing semi-starvation *without* the assistance of these striking psychological mechanisms, as it would be for the top birders, runners, climbers, swimmers, and chess players.

By further understanding the psychological phenomena that underlie AN, we can improve our conceptualization of the disorder with the hope of informing treatment development. Given the high value that individuals with AN place on the pursuit of thinness, it is no surprise that they are frequently resistant to treatment and exhibit low motivation for change. While many practitioners and researchers may fail to appreciate some of the psychological mechanisms that contribute to the common clinical profile of AN, it is also plausible that many clients *themselves* do not recognize the relationship between the effortful behavior required by semi-starvation and the distinctive features (e.g., identity, pride, the facilitation of simplicity and structure) they develop in order to maintain this effortful behavior. Clients with AN often report that their disorder is part of their identity, that AN helps simplify and add structure to their lives, that they compete with others to be thin, that they experience euphoria when they accomplish a goal in the pursuit of thinness, and that they feel proud about their weight loss accomplishments. It appears that many individuals with AN interpret these features as part of their stable nature, simply accepting on the surface, for instance, that “Anorexia helps me to keep control” (Gale et al., 2006). Through collaborative psychoeducation, clients may be able to build insight into the relationship between the effortful nature of AN and the features unique to extreme behaviors, with the hope of reducing resistance to treatment. For example, helping a client build this insight may modify her belief that “Anorexia helps me keep control” to “I am convincing myself that Anorexia helps me keep control.” This

cognitive shift may help clients identify and challenge the maladaptive thoughts and beliefs associated with the disorder.

The impact that the Minnesota Starvation Study has had on the field of eating disorders demonstrates the importance of studying analogous populations to AN. Following a study investigating the response of 36 healthy males undergoing semi-starvation, robust features of severe calorie restriction were identified, including preoccupation with food, ritualized eating, use of food substitutes, hoarding of food, social withdrawal and isolation, depression, increased anxiety, intellectual apathy, and loss of sexual interest (Keys, Brozek, Henschel, Mickelsen, & Taylor, 1950). All of these emotional and behavioral byproducts of semi-starvation emerge in individuals with AN. Many clients with AN are unaware that their preoccupation with food is (at least partially) a robust consequence of semi-starvation, and it is usually not until they are provided with information about semi-starvation and establish regular eating that they begin to disconnect this preoccupation with food from their identity. For this reason, therapists supervised by Dr. Vitousek at the University of Hawaii's outpatient eating disorders clinic routinely present the findings from the Minnesota Starvation Study to clients as psychoeducation in the first few sessions, which has been successful in helping clients understand that the food preoccupation, low mood, social withdrawal, and other related features that they are experiencing are not personal attributes but rather a direct biological response to semi-starvation. For a few clients, this information alone has been sufficient to facilitate significant motivation for change. It is hoped that further research exploring extreme behavior populations will result in findings that might provide a similar impact.

Extreme birders serve as an interesting population to study from a clinical psychology perspective in part because of *parallels* to AN, addiction, and ASD. While furthering our understanding of extreme behavior populations may facilitate new insight about AN, it is important to note that there is no intent to “pathologize” competitive birders. A few participants reported concern about the negative implication of some of the questionnaire items, indicating that their birding experiences have led to far greater perceived benefits than costs. The overall results from the present study support this view. Extreme birders reported receiving a host of benefits from the pursuit, including being active and healthy, traveling to exciting new locations, becoming aware of important conservation issues, being introduced to new people, and becoming closer to friends. The nature of the pursuit chosen by these diverse extreme behavior populations translates to varying degrees of costs and impairment: individuals undergoing semi-starvation will experience a different set of costs from those attempting to see the greatest number of birds or climb the tallest mountains or run the longest distances. Although extreme birders do appear to encounter a number of physical, financial, and interpersonal costs, they pale in comparison to the severe physical and psychological consequences of semi-starvation. AN is a debilitating condition despite the benefits that patients report experiencing from the disorder. The results from the present study suggest that extreme birders experience a range of benefits without a comparable level of impairment; indeed, extreme birders did not endorse greater physical or psychological impairment than non-extreme birders on the SF-12.

Similarly, although extreme birders reported many features that overlap with addiction, the objective of this line of investigation was not to characterize extreme



birding as another form of addiction. Extreme birders were just as likely as non-extreme birders to describe achieving their birding or listing goals as fulfilling, and the majority of participants in all three birding groups reported that achieving these goals was as fulfilling as they had expected. Extreme birders were more likely, however, to report experiencing other features that overlap with addiction, including a pattern of escalation, functional autonomy, and describing the pursuit as an “addiction.” As described earlier, these characteristics also emerge in anecdotes from practitioners of other extreme behaviors and in individuals with AN, and research suggests that it would be inaccurate to conceptualize these effortful behaviors as equivalent to substance abuse. The identification of features that overlap with addiction in extreme birders does, however, lend further support to the hypothesis that these diverse patterns of valued, effortful behavior have a number of features in common with one another.

Extreme birders were also more likely to report having a single-minded focus and a tendency to systemize, a characteristic feature of individuals with ASD. This finding provides support to the speculation that a drive to systemize facilitates a preference for and/or skill in analytical, concrete, rule-based, and detail-oriented pursuits as more extreme birders reported a greater single-minded focus and higher scores on the adapted SQ-R. As hypothesized, there was a smaller proportion of women in the extreme birder group than in the mid-range birder group, which contained a smaller proportion of women than the low-intensity birder group. Additionally, the women and men in the extreme birder group did not present with significantly different levels of systemizing or a single-minded focus. These findings are consistent with Baron-Cohen’s (2003) prediction that people with a tendency to systemize will be attracted to concrete rule-

based pursuits such as birding, and that there will be an overrepresentation of males participating in these activities as they are more likely to have a disposition to systemize compared to females.

Somewhat surprising, however, was the finding that men and women in the entire sample did not differ significantly on levels of systemizing or a single-minded focus, despite the greater proportion of men who were categorized as extreme birders. This is the first study that has failed to find a significant difference between groups of males and females on systemizing, suggesting that birding is a pursuit that attracts individuals who have a tendency to systemize regardless of gender. Although there were no significant differences on rates of systemizing between men and women within the extreme birder group, female extreme birders did obtain a non-significantly higher mean score than male extreme birders. In contrast, female low-intensity birders obtained a non-significantly lower mean score than male low-intensity birders. Thus, a post-hoc regression analysis testing for a Gender  $\times$  Systemizing interaction was conducted, which yielded significant results. The lack of significant differences between male and female birders on rates of systemizing in the sample may hence be a result of the more dramatic rate of change in female birders' systemizing scores as they become more extreme. On the other hand, the opposite was found with responses to the item assessing for a single-minded focus: compared to female birders, male birders exhibited a sharper increase in reported single-minded focus as they become more extreme. Since the SQ-R was specifically designed to include items from both traditionally male and female domains, it may be a less biased measure of this construct than one item asking participants about their single-minded focus. It may be the case that many of the females who become extreme birders have an

even higher disposition to systemize than their extreme male counterparts to motivate them to initiate and continue pursuing such a male-dominated activity.

### *Limitations*

A number of limitations to the present study should be noted. Unlike prior research conducted with birders (e.g., Cole & Scott, 1999; Hvenegaard, 2002; McFarlane, 1994; Scott & Thigpen, 2003), the recruitment of participants from the Internet allowed for a larger sample size that was not limited to a specific region, birding event, or birding organization, and the demographic and birding-related data collected from participants suggested that a representative sample of birders was obtained. However, participation in this sample was restricted to active Internet users, particularly those who visit online birding forums and blogs, and it is possible that birders who frequent these websites differ from birders who do not. Fortunately, competitive birders are more likely to be active Internet users than other extreme behavior populations, as birders often make use of online resources to assist with bird sightings and species verification, decreasing concern that online recruitment led to a biased sample of birders in the present study. On the other hand, it is possible that the characteristics of birders who chose to participate in the current project may have differed from those who did not, potentially skewing the results. For instance, the birders who chose to participate may have been more likely than non-participants to endorse positive aspects of birding. Additionally, since the majority of the forums and blogs contacted were based in the United States, the sample was predominantly American, and thus may not be representative of birders from other countries. Replication of the current study with a more global population of birders

recruited via a diverse set of methods would increase confidence that the findings are representative of all birders.

It should also be noted that most of the measures employed in the present study have not undergone testing of psychometric properties. The items that were created specifically for this investigation were rationally, rather than empirically, derived from themes in anecdotal accounts of extreme birders as interpreted by the investigator and Dr. Vitousek, an expert in the field of extreme behaviors. Like all rationally derived measures, the selection and language of items are impacted by investigator bias. The language used in many of the items was also somewhat advanced, which may restrict individuals with limited educational experiences from fully understanding these items. Consistent with information from anecdotal accounts of extreme birders, however, most of the participants in the study were highly educated.

As noted earlier, quotes from birders' personal accounts were incorporated into many of the questionnaire items in order to reduce defensiveness, particularly for more sensitive items. Despite the goal of promoting accuracy, it is possible that the inclusion of quotes led certain participants who strongly identified with being a serious birder to endorse these items predominantly because they connected with the renowned birders who were cited.

Additionally, very few of the items measuring the dependent variables were reverse scored, which raises the possibility that participants who endorsed higher scores on these items did so simply because of a tendency to choose higher items on a Likert scale. Fortunately, the items that make up the independent variable (i.e., the "Active" score) that was used as the marker for birding involvement relied predominantly on

behavioral indicators (see Table 7) that are more likely to be robust to item response patterns. As described earlier, the “Active” score combined z-scored variables that were measured on a variety of different scales, including ratio, nominal, and Likert response options. The lack of a consistent scale across these items may have introduced error into the computation of the independent variable, limiting the interpretation of the results. Future research attempting to measure birding involvement would benefit from employing items with consistent response options. Although the convergence of responses across items assessing similar constructs (e.g., the “Provides Personal Identity” subscale of the CCS-R and the individual identity item) is promising, all results should be considered preliminary until the reliability and validity of the instruments have been examined.

The large number of individual analyses conducted also raises concern about the increased likelihood of making a Type I error, particularly with an unadjusted conventional alpha level of .05. In other words, it would be expected that 5% of the tests would yield significant results by chance alone. In light of the exploratory nature of the present study, however, the primary investigator decided not to take a more conservative approach to correct for the problems that may arise with multiple comparisons. As it happened, almost all of the primary analyses were significant at a  $p$ -value of less than .001, indicating that the same conclusions would have been drawn even if conservative methods were used to control for familywise error rate. Moreover, convergent findings were observed for items attempting to measure a similar construct. For example, consistent results were found on all three items measuring a pattern of escalation, increasing confidence that these results are not a product of chance.

## *Conclusion*

Despite these limitations, the results support the speculation that themes prevalent in anecdotal accounts from extreme birders accurately represent the reported behaviors, experiences, and psychological mechanisms of this population. As birders become more extreme, they are more likely to report: a number of benefits from birding; a host of physical, financial, and interpersonal costs; features that emerge in practitioners of other extreme behaviors and AN; characteristics that overlap with addiction; concerns about change; and a tendency to systemize. The present study is the first investigation that has assessed these features in extreme birders, and is likely a more representative sample of birders than prior studies that have recruited participants from a specific region, birding event, or birding organization. Further research on birders and other extreme behavior populations is needed to evaluate the hypothesis that similar psychological phenomena underlie the features that appear to emerge across these effortful patterns, as well as AN. Continuing exploration of these issues within these populations may help demystify the sometimes puzzling and counterintuitive features observed in extreme birders, practitioners of other extreme behaviors, and individuals with AN.

## **Appendix A: Informed Consent**

### **Agreement to Participate in a Research Study:**

#### **Investigating the Distinctive Features of Birders**

Jamal Essayli  
Primary Investigator  
(949) 292-3181  
jessayli@hawaii.edu

**Why is this study being done?** This research project is being conducted by graduate student Jamal Essayli and associate professor Kelly Vitousek, Ph.D. in the Department of Psychology at the University of Hawai'i at Manoa. The purpose of the project is to better understand the distinctive characteristics of birders and to compare the characteristics and motivations shared by serious birders and participants of other high-intensity behaviors. You are being asked to participate because of your interest and involvement in birding.

**What am I being asked to do?** Participation in the project will consist of completing a questionnaire that inquires about demographic characteristics, birding expertise, commitment to birding, experiences through birding, potential benefits and costs of birding, and related concepts. This study is confidential. No personal identifying information will be included with the research results. All research records collected online will be stored in password-protected files. Participation in this study will take no more than one hour. Approximately 50 birders will be recruited from the Internet to take part in the study.

**What are the risks?** The investigators foresee little to no risk to participating in this research study. If any participants do experience distress or discomfort responding to questionnaire items, they are encouraged to contact the investigators with their concerns or withdraw from participation at any time.

**What are the benefits?** There may be no direct benefits to you as a result of your participation; however, it is anticipated that the results of this study will provide increased knowledge to the field as a whole about the understudied experiences and characteristics of birders.

**What about confidentiality?** Research data will be confidential to the extent allowed by law. Agencies with research oversight, such as the UH Committee on Human Studies, have the authority to review research data. All research records will be stored in password-protected files in locked rooms for the duration of the research project. All research records will be destroyed upon completion of the project.

**What other options do I have?** Participation in this research project is completely voluntary. You are free to withdraw from participation at any time during the course of the project with no penalty and with no questions asked.

**Who do I call if I have questions or problems?** If you have any questions regarding this research project, please contact the Principal Investigator at [jessayli@hawaii.edu](mailto:jessayli@hawaii.edu). You may also contact the UH Committee on Human Studies directly at (808) 956-5007.

If you have any questions regarding your rights as a research participant, please contact the UH Committee on Human Studies at (808) 956-5007.

**Participant:**

Please feel free to print this page to keep for your records. Please click “Next” if you agree to participate, and the study will begin.



## Appendix B: Birder Questionnaires

What is your age? \_\_\_\_\_

What is your gender?

- Male
- Female

What is your sexual orientation?

- Heterosexual
- Homosexual
- Bisexual
- Other
- Prefer Not to Answer

What is your marital status (select all that apply)?

- Single
- Living with Partner
- Married or Equivalent
- Separated
- Divorced
- Widowed
- Other: \_\_\_\_\_

Are you currently in a romantic relationship?

- Yes
- No

(If applicable) Is the person with whom you are in a romantic relationship with also a birder?

- Yes
- No

(If applicable) Are you a more serious birder than your romantic partner?

- Yes, I am a much more serious birder than my partner
- Yes, I am slightly more serious birder than my partner
- No, my partner and I are about equally serious about birding
- No, I am a slightly less serious birder than my partner
- No, I am a much less serious birder than my partner

Where were you born?

State/Province: \_\_\_\_\_

Country: \_\_\_\_\_

Where do you currently live?

State/Province: \_\_\_\_\_

Country: \_\_\_\_\_

What is your approximate annual income in U.S. dollars?

- Less than \$20,000
- Between \$20,000 - \$39,999
- Between \$40,000 - \$59,999
- Between \$60,000 - \$79,999
- Between \$80,000 - \$99,999
- Between \$100,000 - \$119,999
- Between \$120,000 - \$139,999
- Between \$140,000 - \$159,999
- Between \$160,000 - \$179,999
- Between \$180,000 - \$199,999
- Over \$200,000
- Not Sure
- Prefer Not to Answer

What is your total household income in U.S. dollars?

- Less than \$20,000
- Between \$20,000 - \$39,999
- Between \$40,000 - \$59,999
- Between \$60,000 - \$79,999
- Between \$80,000 - \$99,999
- Between \$100,000 - \$119,999
- Between \$120,000 - \$139,999
- Between \$140,000 - \$159,999
- Between \$160,000 - \$179,999
- Between \$180,000 - \$199,999
- Over \$200,000
- Not Sure
- Prefer Not to Answer

What is your ethnicity? (Select all that apply)

- American Indian or Alaskan Native
- Asian
- Black or African-American
- Pacific Islander or Native Hawaiian
- White
- Other (Please Specify): \_\_\_\_\_

What is your highest level of education?

- Some High School
- High School Diploma/GED
- Some College
- 4 Year College Degree
- Some Graduate School
- Master's Degree
- Doctoral Degree
- Professional Degree

Is birding the most important outdoor activity to you?

- Yes
- No
- Unsure

Do you keep a life list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your life list? (If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Do you keep a continental list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your continental list? (If you have more than one continental list, please enter the number of birds on the continental list that is most important to you. If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Do you keep a national list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your national list? (If you have more than one national list, please enter the number of birds on the national list that is most important to you. If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Do you keep a state/province list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your regional (state, province, or county) list? (If you have more than one state/province list, please enter the number of birds on the state/province list that is most important to you. If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Do you keep a county/city list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your county/city list? (If you have more than one county/city list, please enter the number of birds on the county/city list that is most important to you. If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Do you keep a patch list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your patch list? (If you have more than one patch list, please enter the number of birds on the patch list that is most important to you. If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Do you keep a yard list?

- Yes
- No
- Unsure

(If applicable) How many birds do you currently have on your yard list? (If you have more than one yard list, please enter the number of birds on the yard list that is most important to you. If you don't know the exact number of birds on your list, please estimate to the best of your abilities.)

\_\_\_\_\_ birds

Which of the following lists are you most focused on contributing to? (Select all that apply)

- Life List
- Continental List
- National List
- State/Province List
- County/City List
- Patch List
- Yard List
- None

Are you actively trying to increase the number of birds on your list(s)?

- Yes
- No
- Unsure

Do you submit your list(s) to any birding organization or online birding site?

- Yes
- No
- Unsure

Are you willing to travel 1 hour on short notice to see a rare bird?

- Yes
- No
- Unsure

Are you willing to travel 5 hours on short notice to see a rare bird?

- Yes
- No
- Unsure

**IN THE PAST 12 MONTHS**, *approximately* how many days have you spent on trips (i.e., traveling distances greater than 50 miles from your home) with the specific focus of birding?

\_\_\_\_\_ days (0 - 365)

**IN THE PAST 12 MONTHS**, *approximately* how many days have you spent actively looking at, searching for, and/or chasing down birds (including, but not exclusive to, days spent on birding trips)?

\_\_\_\_\_ days (0 - 365)

**IN THE PAST 12 MONTHS**, *approximately* how many days have you spent somehow engaged in the activity of birding (this would include, for example, birding trips, preparing for future trips, studying or reading about birds or birding, improving skills related to bird identification, reading or updating birding blogs, looking at local, national, or international bird alerts, etc.)?

\_\_\_\_\_ days (0 - 365)

**IN THE PAST 12 MONTHS**, *approximately* how many days involved you thinking about or being conscious of birding-related activities?

\_\_\_\_\_ days (0 - 365)

**IN THE NEXT 12 MONTHS**, do you expect that your involvement in birding-related activities will:

- Increase
- Decrease
- Stay the Same

*Approximately* how many bird species can you **currently** identify by sight?

\_\_\_\_\_ birds

*Approximately* how many bird species can you **currently** identify by sound?

\_\_\_\_\_ birds

**IN YOUR LIFETIME**, *approximately* how many different countries have you traveled to for birding-related purposes?

\_\_\_\_\_ Countries

What is the *approximate* total cost of all your birding-related equipment that you **currently** own in U.S. dollars?

- Less than \$100
- Between \$100 - \$499
- Between \$500 - \$999
- Between \$1,000 - \$4,999
- Between \$5,000 - \$9,999
- More than \$10,000
- Not Sure
- Prefer Not to Answer



Thinking about all the days that you spent traveling for any reason **IN THE PAST YEAR**, *approximately* what percentage of those travel days involved you actively looking at, searching for, and/or chasing down birds?

- Less than 10% of the days
- Between 10% - 20% of the days
- Between 20% - 30% of the days
- Between 30% - 40% of the days
- Between 40% - 50% of the days
- Between 50% - 60% of the days
- Between 60% - 70% of the days
- Between 70% - 80% of the days
- Between 80% - 90% of the days
- More than 90% of the days

**Please answer the following questions on a scale from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*) as completely and honestly as possible:**

	Strongly Disagree							Strongly Agree
1. If I stopped birding, I would probably lose touch with a lot of my friends	1	2	3	4	5	6	7	
2. If I couldn't go birding I am not sure what I would do	1	2	3	4	5	6	7	
3. Because of birding, I don't have time to spend participating in other leisurely activities	1	2	3	4	5	6	7	
4. Most of my friends are in some way connected with birding	1	2	3	4	5	6	7	
5. I consider myself to be somewhat expert at birding	1	2	3	4	5	6	7	
6. I find that a lot of my life is organized around birding	1	2	3	4	5	6	7	

7. Others would probably say that I spend too much time birding	1	2	3	4	5	6	7
8. I would rather go birding than do most anything else	1	2	3	4	5	6	7
9. Other leisure activities don't interest me as much as birding	1	2	3	4	5	6	7

**To what extent do each of the following contribute to your reasons for birding on a scale from 1 (*Not At All*) to 7 (*Extremely*):**

(order of items are randomized)

	<u>Not At All</u>					<u>Extremely</u>	
	1	2	3	4	5	6	7
Birding keeps me active and healthy							
Birding increases my awareness of important conservation issues	1	2	3	4	5	6	7
Birding exposes me to a beautiful diversity of bird species	1	2	3	4	5	6	7
Birding exposes me to exciting new locations	1	2	3	4	5	6	7
Birding is adventurous	1	2	3	4	5	6	7
Birding adds enjoyment to my life	1	2	3	4	5	6	7
Birding provides me with new challenges	1	2	3	4	5	6	7
Birding expands my knowledge	1	2	3	4	5	6	7
Birding introduces me to new people	1	2	3	4	5	6	7
Birding brings me closer to my friends	1	2	3	4	5	6	7
Birding brings me closer to my family	1	2	3	4	5	6	7
Birding adds a sense of accomplishment to my life	1	2	3	4	5	6	7
Birding helps me understand myself better	1	2	3	4	5	6	7

Select the top three of the following that most contribute to your reasons for **birding**:

(order of items are randomized)

Birding keeps me active and healthy

Birding increases my awareness of important conservation issues

Birding exposes me to a beautiful diversity of bird species

Birding exposes me to exciting new locations

Birding is adventurous

Birding adds enjoyment to my life

Birding provides me with new challenges

Birding expands my knowledge

Birding introduces me to new people

Birding brings me closer to my friends

Birding brings me closer to my family

Birding adds a sense of accomplishment to my life

Birding helps me understand myself better

How old were you when you first became interested in birding?

\_\_\_\_\_ years old

Did a “spark bird” initially stimulate your interest in birding?

- Yes (If so, which bird: \_\_\_\_\_)
- No
- Unsure

Did a birding book initially stimulate your interest in birding?

- Yes (If so, which book: \_\_\_\_\_)
- No
- Unsure

Do you remember a specific moment in time when you became “hooked” on birding?

- Yes
- No
- Unsure

To what extent do you get a sense of euphoria when you see a new bird species?

Not At All			Somewhat			Extremely
1	2	3	4	5	6	7

Birder Sean Dooley stated that: “The real birder has a single-minded tenacity. That’s why they are . . . so damned good at what they do.” Compared to other people, to what extent do you have a more single-minded focus?

Not At All			Somewhat			Extremely
1	2	3	4	5	6	7

To what extent do competitive goals contribute to your interest in birding?

Not At All			Somewhat			Extremely
1	2	3	4	5	6	7

In an interview with Mark Obmascik, author of “The Big Year,” he stated that: “I ended up concluding that . . . the Big Year contest was as much about honor and integrity as it was about winning.” To what extent do you view honor and integrity as central to your birding pursuits?

Not At All			Somewhat			Extremely
1	2	3	4	5	6	7

How important is it for you to have respect for your birding skills from other birders?

Not At All			Somewhat			Extremely
1	2	3	4	5	6	7

To what extent would you feel embarrassed to carry a field guide while birding?

Not At All			Somewhat			Extremely
1	2	3	4	5	6	7

Birder Simon Barnes stated that: “I don’t go birdwatching. I am birdwatching. Birdwatching is a state of being, not an activity.” To what extent do you consider birding to be part of your identity?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

To what extent do you get a sense of pride from your accomplishments as a birder?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

To what extent do you experience a sense of satisfaction from your ability to identify more bird species than most other people?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

To what extent do you experience a sense of satisfaction from listing more bird species than most other people?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

Birder Sean Dooley stated that: “When you identify and list things, [you can] impose order on an otherwise baffling universe.” To what extent does birding help you impose order on life?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

Birder Sean Dooley described birding as “the only record that I was . . . actually capable of breaking.” To what extent does this sentiment contribute to your motivations for birding?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

To what extent do you find it necessary to increase the number of birds on your list to continue gaining pleasure from birding?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7



Arguments with friends	<b>Yes</b>	<b>No</b>	<b>Unsure</b>
Difficulty finding a suitable romantic partner	<b>Yes</b>	<b>No</b>	<b>Unsure</b>
Difficulty spending sufficient time with your romantic partner	<b>Yes</b>	<b>No</b>	<b>Unsure</b>
Difficulty spending sufficient time with your children	<b>Yes</b>	<b>No</b>	<b>Unsure</b>
Difficulty spending sufficient time with relatives	<b>Yes</b>	<b>No</b>	<b>Unsure</b>
Difficulty spending sufficient time with friends	<b>Yes</b>	<b>No</b>	<b>Unsure</b>
Ending of a serious romantic relationship	<b>Yes</b>	<b>No</b>	<b>Unsure</b>

**Please answer the following questions as honestly as possible:**

Some birders have reported that birding has increased their self-esteem. To what extent has birding increased your self-esteem?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

Some birders have reported that birding has helped to prevent or moderate unpleasant mood states (e.g., depression, anxiety, anger). To what extent has birding helped you prevent or moderate unpleasant mood states?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

Author Dan Koeppel stated that: “Most Big Listers [are trying] to outrun their personal demons by chasing after something else.” To what extent is this true for you?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7

Author Dan Koeppel described his father as a birder who eventually became unable to stop birding: “When [his] birding became oversized, he said he’d stop. At five thousand. At six thousand. At seven thousand.” Has this type of escalation pattern been true for you and your birding or listing goals?

Not At All                      Somewhat                      Extremely  
1      2      3      4      5      6      7





During the past four weeks, were you limited in the kind of work or other regular activities you do as a result of your physical health?

- No
- Yes

During the past four weeks, have you accomplished less than you would like to as a result of any emotional problems, such as feeling depressed or anxious?

- No
- Yes

During the past four weeks, did you not do work or other regular activities as carefully as usual as a result of any emotional problems such as feeling depressed or anxious?

- No
- Yes

During the past four weeks, how much did pain interfere with your normal work, including both work outside the home and housework? Did it interfere not at all, slightly, moderately, quite a bit, or extremely?

- Not at all
- Slightly
- Moderately
- Quite a bit
- Extremely

**These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.**

How much time during the past 4 weeks have you felt calm and peaceful? All of the time, most of the time, a good bit of the time, some of the time, a little of the time, or none of the time?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

How much of the time during the past 4 weeks did you have a lot of energy?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

How much of the time during the past 4 weeks have you felt down?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities like visiting with friends, relatives etc?

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little of the time
- None of the time

**The questionnaire on the following page was designed to be used with people from a diversity of pursuits. Thus, you may find that some of the items do not apply to birding.**

*Whether or not you have ever considered stopping birding, we are interested in the concerns that you personally might have if you were faced with giving up birding. Some of the concerns that people might have about giving up birding are listed below.*

Please indicate how much each statement applies to you, using the following scale in making your responses:

1	2	3	4	5
the statement <u>would not</u> reflect my concerns at all	the statement would <u>slightly</u> reflect my concerns	the statement would reflect my concerns to a <u>moderate</u> extent	the statement would reflect my concerns to a <u>considerable</u> extent	the statement would <u>very strongly</u> reflect my concerns

1. I may lose a sense of self-control if I change
2. This pursuit is an important part of my identity
3. In many ways, this pursuit simplifies the difficulties of adult life
4. I don't want to change this part of my life
5. I wouldn't be able to express how I feel if I change
6. I'd have no excuse for my failures if I change
7. It is not within my power to change
8. I may go crazy if I try to change
9. I'd have to give up all my friends if I change
10. My pursuit shelters me from all the complications of being an adult
11. I may be at greater risk of physical injury if I change
12. It's just a question of individual preferences for me to be the way I am right now
13. I wouldn't have anything to help me forget my problems if I change
14. I may have to deal with my sexuality if I change
15. I may not have as much fun if I change
16. I like being identified as someone who does this pursuit
17. The process of change would be too painful for me to bear
18. Nothing can help me, so there's no point in trying
19. I'm not convinced that I really need to change
20. I'd have to start making definite plans for the future if I change
21. This pursuit gets me things I want
22. My pursuit reduces sexual conflicts
23. I don't have the skills I need to change
24. Life would be boring if I change
25. Without this pursuit, I wouldn't have any other ways of coping with stress
26. I may be exposed to more real dangers if I change
27. Attempting to change will make my life more difficult
28. I'd have a hard time talking to people if I change
29. If I change, the opposite sex may pay too much attention to me
30. I may lose a feeling of pride in myself if I change
31. I wouldn't have any outlet for my feelings if I change
32. I may feel less intense and alive if I change
33. I'm afraid that people will stop worrying about me if I change
34. I may not have anything else to feel good about if I change
35. Change is just too risky for me
36. I may have to give up being a little girl/boy if I change
37. My friends wouldn't accept me if I change
38. I'd have to take responsibility for my mistakes if I change
39. In spite of what other people think, I really don't see this issue as a major problem

40. This pursuit helps me obtain an immediate goal
41. I'd have nothing to take away the pain if I change
42. My pursuit gives me a way to deal with unpleasant situations
43. I may risk making a fool of myself if I change
44. I may lose some control over others if I change
45. Even though other people say that they want me to change, I'm not sure that they really do
46. I may lose some self-respect if I change
47. I wouldn't know how to define myself any more if I change
48. This pursuit is useful to me now, and I can't worry about how it may affect me later
49. I may receive unwelcome sexual advances if I change
50. I'd have to quit goofing off if I change
51. Deep down, I just don't think it's possible for me to change
52. If everybody would stop bothering me about this, I'd be fine
53. I don't want to experience the suffering that would be involved in trying to change
54. Attempting to change may make me feel worse than I do now
55. I may not be strong enough to change
56. I may lose everything I have accomplished if I change
57. This pursuit may cause difficulties for me in the future, but it helps me now
58. If I change, I may become just like everyone else
59. My pursuit helps me to avoid intimate adult relationships
60. I wouldn't have anything in common with my friends if I change
61. I may miss out on a lot of pleasure if I change
62. My friends wouldn't have anything to do with me if I change
63. The process of changing just requires too much effort
64. I would be giving up something I've worked hard for if I change
65. I believe that my attempts to change are doomed to failure
66. I may get less attention from others if I change
67. I would prefer to remain childlike
68. I need this pursuit to accomplish an important objective
69. I'm just too frightened of change
70. I may lose someone I love if I change
71. My pursuit gives me some relief from unpleasant emotions
72. I'd have to develop a new peer group if I change
73. I wouldn't have any way of blowing off steam if I change
74. I think this pursuit is a reasonable and valid choice
75. This pursuit is part of what makes me unique and special
76. My problem allows me to hold on to some of the safety and security of childhood
77. I'd have to face the fact that I haven't done much with my life if I change
78. I couldn't say what's on my mind if I change
79. I may lose control over my sexual impulses if I change
80. Some people may stop taking care of me if I change

81. The things I'd have to go through in order to change are too unpleasant
82. My friends would give me a hard time if I change
83. There would be no excitement in my life if I change
84. Without this pursuit, I wouldn't be able to deal with all the pressure I have in my life
85. I wouldn't have anything else to make me feel more powerful if I change
86. I may have to grow up if I change
87. If I change, I will be giving up my chance to succeed in meeting my goals
88. I'd have a hard time telling other people what I think if I change
89. This pursuit is so much a part of me that I can't imagine myself any other way
90. I'd really have to start taking responsibility for my life if I change

**Please answer the following questions on a scale from 1 (Definitely Disagree) to 5 (Definitely Agree).**

1. I find it very easy to use train timetables, even if this involves several connections.
2. I like music or book shops because they are clearly organised.
3. I would not enjoy organising events e.g. fundraising evenings, fetes, conferences.
4. When I read something, I always notice whether it is grammatically correct.
5. I find myself categorising people into types (in my own mind).
6. I find it difficult to read and understand maps.
7. When I look at a mountain, I think about how precisely it was formed.
8. I am not interested in the details of exchange rates, interest rates, stocks and shares.
9. If I were buying a car, I would want to obtain specific information about its engine capacity.
10. I find it difficult to learn how to programme video recorders.
11. When I like something I like to collect a lot of different examples of that type of object, so I can see how they differ from each other.
12. When I learn a language, I become intrigued by its grammatical rules.
13. I like to know how committees are structured in terms of who the different committee members represent or what their functions are.

14. If I had a collection (e.g. CDs, coins, stamps), it would be highly organised.
15. I find it difficult to understand instruction manuals for putting appliances together.
16. When I look at a building, I am curious about the precise way it was constructed.
17. I am not interested in understanding how wireless communication works (e.g. mobile phones).
18. When travelling by train, I often wonder exactly how the rail networks are coordinated.
19. I enjoy looking through catalogues of products to see the details of each product and how it compares to others.
20. Whenever I run out of something at home, I always add it to a shopping list.
21. I know, with reasonable accuracy, how much money has come in and gone out of my bank account this month.
22. When I was young, I did not enjoy collecting sets of things e.g. stickers, football cards, etc.
23. I am interested in my family tree and in understanding how everyone is related to each other in the family.
24. When I learn about historical events, I do not focus on exact dates.
25. I find it easy to grasp exactly how odds work in betting.
26. I do not enjoy games that involve a high degree of strategy (e.g. chess, Risk, Games Workshop).
27. When I learn about a new category, I like to go into detail to understand the small differences between different members of that category.
28. I do not find it distressing if people who live with me upset my routines.
29. When I look at an animal, I like to know the precise species it belongs to.
30. I can remember large amounts of information about a topic that interests me e.g. flags of the world, airline logos.
31. At home, I do not carefully file all important documents e.g. guarantees, insurance policies.

32. I am fascinated by how machines work.
33. When I look at a piece of furniture, I do not notice the details of how it was constructed.
34. I know very little about the different stages of the legislation process in my country.
35. I do not tend to watch science documentaries on television or read articles about science and nature.
36. If someone stops to ask me the way, I'd be able to give directions to any part of my home town.
37. When I look at a painting, I do not usually think about the technique involved in making it.
38. I prefer social interactions that are structured around a clear activity, e.g. a hobby.
39. I do not always check off receipts etc. against my bank statement.
40. I am not interested in how the government is organised into different ministries and departments.
41. I am interested in knowing the path a river takes from its source to the sea.
42. I have a large collection e.g. of books, CDs, videos etc.
43. If there was a problem with the electrical wiring in my home, I'd be able to fix it myself.
44. My clothes are not carefully organised into different types in my wardrobe.
45. I rarely read articles or webpages about new technology.
46. I can easily visualise how the motorways in my region link up.
47. When an election is being held, I am not interested in the results for each constituency.
48. I do not particularly enjoy learning about facts and figures in history.
49. I do not tend to remember people's birthdays (in terms of which day and month this falls).
50. When I am walking in the country, I am curious about how the various kinds of trees differ.

51. I find it difficult to understand information the bank sends me on different investment and saving systems.
52. If I were buying a camera, I would not look carefully into the quality of the lens.
53. If I were buying a computer, I would want to know exact details about its hard drive capacity and processor speed.
54. I do not read legal documents very carefully.
55. When I get to the checkout at a supermarket, I pack different categories of goods into separate bags.
56. I do not follow any particular system when I'm cleaning at home.
57. I do not enjoy in-depth political discussions.
58. I am not very meticulous when I carry out D.I.Y or home improvements.
59. I would not enjoy planning a business from scratch to completion.
60. If I were buying a stereo, I would want to know about its precise technical features.
61. I tend to keep things that other people might throw away, in case they might be useful for something in the future.
62. I avoid situations which I cannot control.
63. I do not care to know the names of the plants I see.
64. When I hear the weather forecast, I am not very interested in the meteorological patterns.
65. It does not bother me if things in the house are not in their proper place.
66. In maths, I am intrigued by the rules and patterns governing numbers.
67. I find it difficult to learn my way around a new city.
68. I could list my favourite 10 books, recalling titles and authors' names from memory.
69. When I read the newspaper, I am drawn to tables of information, such as football league scores or stock market indices.
70. When I'm in a plane, I do not think about the aerodynamics.



71. I do not keep careful records of my household bills.

72. When I have a lot of shopping to do, I like to plan which shops I am going to visit and in what order.

73. When I cook, I do not think about exactly how different methods and ingredients contribute to the final product.

74. When I listen to a piece of music, I always notice the way it's structured.

75. I could generate a list of my favourite 10 songs from memory, including the title and the artist's name who performed each song.

**Thank you so much for your participation! In order to get a better understanding of the understudied population of birders, we are trying to recruit as many qualified participants as possible.**

**If you know of any birders that might be interested in participating, please feel free to:**

**A) Copy and paste the link listed below and send it to them:**

**[www.surveymonkey.com/birderstudy](http://www.surveymonkey.com/birderstudy)**

**OR**

**B) Ask them to contact me at my email address: [jessayli@hawaii.edu](mailto:jessayli@hawaii.edu)**

## Appendix C: Email Template for Pilot Participants

Dear [First Name],

This is Jamal, the graduate student who contacted you several months ago about participating in a research project investigating the distinctive features of extreme birders. I hope your birding pursuits and life in general during these last few months have gone well.

My research advisor and I have completed the first draft of the questionnaire that we plan to administer to a wide range of birders. Because your knowledge and involvement with birding far exceed our own, we hope to get feedback from birders such as yourself before finalizing the questionnaire.

Would you be interested in being part of a pilot group of participants who would provide us with feedback about the questionnaire? If so, I will send you a link to the online questionnaire and then ask you some questions about different components of the survey. We can correspond by email, phone, or any other method that would be most convenient for you. If you would prefer to participate after the questionnaire is finalized, I will hold off on sending you a link to the questionnaire until after we receive feedback from other birders.

Thanks again for your willingness to participate in this project! It is our hope that the results of this study will provide us with increased knowledge about the understudied experiences and characteristics of birders, and we will be more than happy to share our results with you after the data are analyzed. I look forward to hearing back from you.

Best,

Jamal Essayli  
jessayli@hawaii.edu  
(949) 292-3181

## Appendix D: Questions for Pilot Participants

**Thank you for completing the main portion of the study and for offering to serve as a pilot participant! To answer the pilot participant questions, please click “Yes” below.**

Are you still interested in being part of the pilot group of participants who will provide us with feedback about this study?

Yes

No

**The following questions were created to help categorize individuals as serious birders:**

**Is birding the most important outdoor activity to you?**

**Do you keep a list (e.g., life list, national list, etc.)?**

**Are you actively trying to increase the number of birds on your list(s)?**

**Are you willing to travel on short notice to see a rare bird?**

**IN THE PAST 12 MONTHS, approximately how many days have you spent on trips with the specific focus of birding?**

**IN THE PAST 12 MONTHS, approximately how many days have you spent actively looking at, searching for, and/or chasing down birds (including, but not exclusive to, days spent on birding trips)?**

**IN THE PAST 12 MONTHS, approximately how many days have you spent somehow engaged in the activity of birding (this would include, for example, birding trips, preparing for future trips, studying or reading about birds or birding, improving skills related to bird identification, reading or updating birding blogs, looking at local, national, or international bird alerts, etc.)?**

**IN THE PAST 12 MONTHS, approximately how many days involved you thinking about or being conscious of birding-related activities?**

**IN THE NEXT 12 MONTHS, do you expect that your involvement in birding-related activities will increase, decrease, or stay the same?**

**In your opinion, how useful do you think each of the following questions are at differentiating serious birders from more casual birders?**

Is birding the most important outdoor activity to you?

Not At All Useful			Somewhat Useful			Extremely Useful	
1	2	3	4	5	6	7	

Do you keep a list (e.g., life list, national list, etc.)?

Not At All Useful			Somewhat Useful			Extremely Useful	
1	2	3	4	5	6	7	

Are you actively trying to increase the number of birds on your list(s)?

Not At All Useful			Somewhat Useful			Extremely Useful	
1	2	3	4	5	6	7	

Are you willing to travel on short notice to see a rare bird?

Not At All Useful			Somewhat Useful			Extremely Useful	
1	2	3	4	5	6	7	

IN THE PAST 12 MONTHS, approximately how many days have you spent on trips with the specific focus of birding?

Not At All Useful			Somewhat Useful			Extremely Useful	
1	2	3	4	5	6	7	

IN THE PAST 12 MONTHS, approximately how many days have you spent actively looking at, searching for, and/or chasing down birds (including, but not exclusive to, days spent on birding trips)?

Not At All Useful			Somewhat Useful			Extremely Useful	
1	2	3	4	5	6	7	

IN THE PAST 12 MONTHS, approximately how many days have you spent somehow engaged in the activity of birding (this would include, for example, birding trips, preparing for future trips, studying or reading about birds or birding, improving skills related to bird identification, reading or updating birding blogs, looking at local, national, or international bird alerts, etc.)?

Not At All Useful				Somewhat Useful			Extremely Useful
1	2	3	4	5	6	7	

IN THE PAST 12 MONTHS, approximately how many days involved you thinking about or being conscious of birding-related activities?

Not At All Useful				Somewhat Useful			Extremely Useful
1	2	3	4	5	6	7	

IN THE NEXT 12 MONTHS, do you expect that your involvement in birding-related activities will:

- Increase
- Decrease
- Stay the Same

Not At All Useful				Somewhat Useful			Extremely Useful
1	2	3	4	5	6	7	

How would you categorize someone as a serious birder? What questions would you consider using?

What were your overall impressions of the questionnaire? Would you recommend this questionnaire to other birders? Why or why not?

Approximately how long did it take for you to complete the questionnaire?

Were there any questions that struck you as odd, confusing, or offensive? Did you understand all of the questions? Would you recommend adding or deleting any questions?

## **Appendix E: Participant Debriefing Consent**

You have completed a study where you answered questions inquiring about demographic characteristics, birding expertise, commitment to birding, experiences through birding, potential benefits and costs of birding, and related concepts. Your answers on this questionnaire are very valuable and will help us better understand the distinctive characteristics of birders and to compare the characteristics and motivations shared by serious birders and participants of other high-intensity behaviors.

If you have any questions or concerns about the study, or wish to receive additional details about our results, please let the principal investigator know via email at [jessali@hawaii.edu](mailto:jessali@hawaii.edu). You may also contact the UH Committee on Human subjects directly at (808) 956-5007 with any questions or concerns you may have.

## References

- Allison, P. D. (2001). *Missing data. Sage University Papers Series on Quantitative Applications in the Social Sciences, series no. 07–136*. Thousand Oaks, CA: Sage.
- Allport, G. W. (1937). The functional autonomy of motives. *American Journal of Psychology, 50*, 141-156.
- American Birding Association (2011). *American Birding Association*. Retrieved June 18, 2012, from <http://aba.org/>
- Barnes, S. (2004). *How to be a bad birdwatcher*. New York: Pantheon Books.
- Baron-Cohen, S. (2003). *The essential difference: Male and female brains and the truth about autism*. New York, NY: Basic Books.
- Baron-Cohen, S., Richler, J., Bisarya, D., Gurunathan, N., & Wheelwright, S. (2003). The systemizing quotient: An investigation of adults with Asperger syndrome or high-functioning autism, and normal sex differences. In U. F. E. Hill (Ed.), *Autism: Mind and brain* (pp. 161-186). New York, NY, US: Oxford University Press.
- Bemis, K. M. (1987). *A comparison of the subjective experience of individuals with eating disorders and phobic disorders: The "weight phobia" versus "approach-avoidance" models of anorexia nervosa: I and II*. US: ProQuest Information & Learning.
- Billington, J., Baron-Cohen, S., & Wheelwright, S. (2007). Cognitive style predicts entry into physical sciences and humanities: Questionnaire and performance tests of empathy and systemizing. *Learning and Individual Differences, 17*(3), 260-268.
- Breashears, D. (1999). *High exposure: An enduring passion for Everest and unforgiving places*. New York, NY: Simon & Schuster.

- Bruch, H. (1973). *Eating disorders: Obesity, anorexia nervosa and the person within*. New York: Basic Books.
- Bruch, H. (1986). Anorexia nervosa: The therapeutic task. *Handbook of eating disorders: physiology, psychology, and treatment of obesity, anorexia, and bulimia*, 328.
- Burke, S. M., & Orlick, T. (2003). Mental Strategies of Elite High Altitude Climbers: Overcoming Adversity on Mount Everest. *Journal of Human Performance in Extreme Environments*, 7(2), 15-22.
- Cocker, M. (2001). *Birders: Tales of a tribe*. London: Jonathon Cape Random House.
- Coffey, M. (2003). *Where the mountain casts its shadow: The dark side of extreme adventure*. New York: St. Martin's Press.
- Cohen, J. (1992). A power primer. *Psychological Bulletin* 112(1), 155–159.
- Cole, J. S., & Scott, D. (1999). Segmenting participation in wildlife watching: A comparison of casual wildlife watchers and serious birders. *Human Dimensions of Wildlife*, 4(4), 44-61.
- Connell, J. (2009). Birdwatching, Twitching and Tourism: towards an Australian perspective. *Australian Geographer*, 40(2), 203-217.
- Cornell Lab of Ornithology (2011). Killdeer. Retrieved June 11, 2012 from <http://www.allaboutbirds.org/guide/killdeer/id>
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, & Evaluation*, 10(7), 1-9.



- Cox, R., & Orford, J. (2004). A qualitative study of the meaning of exercise for people who could be labelled as 'addicted' to exercise-can 'addiction' be applied to high frequency exercising? *Addiction Research & Theory*, 12(2), 167-188.
- Crisp, A. H., & Burns, T. (1983). The clinical presentation of anorexia nervosa in males. *International Journal of Eating Disorders*, 2(4), 5-10.
- De Castella, T. (2007, November 12). Cold water, hot blood: As winter approaches, Tom de Castella finds that open-air swimming is the best way to beat the blues. *New Statesman*.
- De Rossi, P. (2010). *Unbearable lightness: A story of loss and gain*. New York, NY: Atria Books.
- Donnelly, P. (1994). Take my word for it: Trust in the context of birding and mountaineering. *Qualitative Sociology*, 17(3), 215-241.
- Dooley, S. (2005). *The big twitch: One man, one continent, a race against time – A true story about birdwatching*. Crows Nest NSW: Allen & Unwin Pty Ltd.
- Dunne, (1992). *The feather quest: A North American birder's year*. New York: Dutton.
- Eguskitza, X. & Huey, R. B. (2000). Supplemental oxygen and mountaineering deaths: O<sub>2</sub>: The extra breath of life on Everest and K2? *The American Alpine Journal*, 42(74), 135-138.
- Eubanks, T. L., Stoll, J. R., & Ditton, B. (2004). Understanding the diversity of eight birder sub-populations: Sociodemographic characteristics, motivations, expenditures and net benefits. *Journal of Ecotourism*, 3, 151–172.
- Fairburn, C. G. (2008). *Cognitive behavior therapy and eating disorders*. New York, NY: The Guilford Press.

- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row, Peterson.
- Gale, C., Holliday, J., Troop, N. A., Serpell, L., & Treasure, J. (2006). The Pros and Cons of Change in Individuals with Eating Disorders: A Broader Perspective. *International Journal of Eating Disorders*, 39(5), 394-403.
- Gentile, O. (2009). *Life list: A woman's quest for the world's most amazing birds*. New York: Bloomsbury USA.
- Gillberg, I. C., Rastam, M., & Gillberg, C. (1994). Anorexia nervosa outcome: Six-year controlled longitudinal study of 51 cases including a population cohort. *Journal of the American Academy of Child & Adolescent Psychiatry*, 33, 729-739.
- Goldenfeld, N., Baron-Cohen, S., & Wheelwright, S. (2005). Empathizing and systemizing in males, females, and autism. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, 2(6), 338-345.
- Goodyear, B. S. (1991). Resistance to change, expectancies, and dimensions of personality in psychoactive substance use disorders: A construct validity study of the Concerns About Change Scale. *Dissertation Abstracts International*, 11(51-B), 5574.
- Gray, J. A. (2009). *Psychometric properties of the Concerns about Change Scale: An exploration of concerns about recovery in eating disorders and obsessive-compulsive disorder*. US: ProQuest Information & Learning.
- Haywood, R. (2009, June). The Killdeer on Shetland 2007/08. *Scottish Birds* 29(1), 75-78.
- Heinrich, B. (2001). *Racing the antelope: What animals can teach us about running and life*. New York: Hecco.

- Hornbacher, M. (1998). *Wasted*. New York: HarperCollins.
- Hvenegaard, G. T. (2002). Birder specialization differences in conservation involvement, demographics, and motivations. *Human Dimensions of Wildlife*, 7(1), 21-36.
- Jamison, N, Moslow-Benway, M, & Stiver, N. (2005). *The thrill of victory, the agony of my feet: Tales from the world of adventure racing*. Jackson: Breakaway Books.
- Kaufman, K. (1997). *Kaufman Field Guide to Birds of North America*. New York: Hillstar Editions L.C.
- Kaye, W. (2008). Neurobiology of anorexia and bulimia nervosa. *Physiology & Behavior*, 94(1), 121-135.
- Keel, P. K., Klump, K. L., Miller, K. B., McGue, M., & Iacono, W. G. (2005). Shared transmission of eating disorders and anxiety disorders. *International Journal of Eating Disorders*, 38, 99–105.
- Keys, A., Brozek, J., Henschel, A., Mickelson, O., & Taylor, H. L. (1950). *The biology of human starvation* (Vols. 1–2). Minneapolis: University of Minnesota Press.
- Kim, S. S., Scott, D., & Crompton, J. L. (1997). An exploration of the relationships among social psychological involvement, behavioral involvement, commitment, and future intentions in the context of birdwatching. *Journal of Leisure Research*, 29, 320-341.
- Koeppel, D. (2005). *To see every bird on earth: A father, a son, and a lifelong obsession*. New York: Hudson Street Press.
- Krakauer, J. (1996). *Into the wild*. New York, NY: Villard Books.
- Kuzon, W. M., Urbanek, M. G., & McCabe, S. (1996). The seven deadly sins of statistical analysis. *Annals of Plastic Surgery*, 37, 265-272.

- La Rouche, G. (2001) Birding in the United States: A demographic and economic analysis, US Fish and Wildlife Service, Washington, DC.
- LeBrasseur, N. (interviewer) & Reichardt, L. (interviewee). (2009). Louis Reichardt: The long climb to science's summits. *The Journal of Cell Biology*, 186(5), 634-635.
- Lee, J-H., & Scott, D. (2004). Measuring birding specialization: A confirmatory factor analysis. *Leisure Sciences*, 26(3), 245-260.
- Leung, N., Waller, G., & Thomas, G. (1999). Group cognitive-behavioural therapy for anorexia nervosa: A case for treatment? *European Eating Disorders Review*, 7(5), 351-361.
- Leveugle, L. (Producer & Director). (2010). Twitchers: A Very British Obsession [Television Program]. London, U.K.
- Liep, J. (2001). Airborne kula: The appropriation of birds by Danish ornithologists. *Anthropology today*, 17(5), 10-15.
- Macleod, S. (1981). *The art of starvation*. London: Virago.
- McFarlane, B. L. (1994). Specialization and motivations of birdwatchers. *Wildlife Society Bulletin*, 22(3), 361-370.
- Moore, R. L., Scott, D., & Moore, A. (2008). Gender-based differences in birdwatchers' participation and commitment. *Human Divisions of Wildlife*, 12(2), 89-101.
- Muthén, L.K. and Muthén, B.O. (1998-2010). Mplus User's Guide. Sixth Edition. Los Angeles, CA: Muthén & Muthén
- Nordbo, R. H. S., Espeset, E. M. S., Gulliksen, K. S., Skarderud, F., & Holte, A. (2006). The Meaning of Self-Starvation: Qualitative Study of Patients' Perception of Anorexia Nervosa. *International Journal of Eating Disorders*, 39(7), 556-564.

- Norman, G. (2010). Likert scales, levels of measurement and the "laws" of statistics. *Advances in Health Sciences Education, 15*(5), 625-632.
- Obmascik, M. (2004). *The Big Year: A tale of man, nature, and fowl obsession*. New York: Free Press.
- Oddie, B. (1995). *Bill Oddie's little black bird book* (2nd edition). London: Anova Books.
- Polivy, J., & Herman, C.P. (2002). Causes of eating disorders. *Annual Review of Psychology, 53*, 187–213.
- Scott, D., Baker, S. M., & Kim, C. (1999). Motivations and commitments among participants in the Great Texas Birding Classic. *Human Dimension of Wildlife, 4*, 50–67.
- Scott, D., Ditton, R., Stoll, J., & Eubanks, T. L. (2005). Measuring specialization among birders: Utility of a self-classification measure. *Human Dimensions of Wildlife, 10*(1), 53-74.
- Scott, D., & Thigpen, J. (2003). Understanding the birder as tourist: Segmenting visitors to the Texas Hummer/Bird Celebration. *Human Dimensions of Wildlife, 8*(3), 199-218.
- Sekercioglu, C. (2002). Impacts of birdwatching on human and avian communities. *Environmental Conservation, 29*, 282 -289.
- Serpell, L., Treasure, J., Teasdale, J., & Sullivan, V. (1999). Anorexia nervosa: Friend or foe? *International Journal of Eating Disorders, 25*(2), 177-186.
- Shelley, R. (1997). *Anorexics on anorexia*. London and Philadelphia: Jessica Kingsley Publishers.

- Skarderud, F. (2007). Shame and pride in anorexia nervosa: A qualitative descriptive study. *European Eating Disorders Review*, 15(2), 81-97.
- Snetsinger, P. (2003). *Birding on borrowed time*. Colorado Springs: American Birding Association.
- Steinberg, H. & Sykes, E. A. (1985). Introduction to symposium on endorphins and behavioural processes: Review of literature on endorphins and exercise. *Pharmacology Biochemistry and Behaviour*, 23, 857–862.
- Stoll, J., Ditton, R. & Eubanks, T. (2006) Platte River birding and the spring migration: humans, value and unique ecological resources, *Human Dimensions of Wildlife*, 11, 241-254.
- Stratton, M. (2004 October, 30). Behind the smile. *The Guardian*, 18.
- Takishima (2012). *Attitudes toward extreme patterns of behavior*. Unpublished manuscript, University of Hawaii at Manoa, Honolulu, HI.
- Tracy, J. L., & Robins, R. W. (2007). The nature of pride. In J. L. Tracy, R. W. Robins & J. P. Tangney (Eds.), *The self-conscious emotions: Theory and research* (pp. 263-282). New York, NY, US: Guilford Press.
- Veale, D. M. W. (1987). Exercise dependence. *British Journal of Addiction*, 82, 735–740.
- Vitousek, K. M. (2004). The case for semi-starvation. *European Eating Disorders Review*, 12, 275-278.
- Vitousek, K. M. (2010, June). *Coming together without losing our way*. Keynote address given at the International Conference on Eating Disorders, Salzburg, Austria.
- Vitousek, K., M., DeViva, J., Slay, J., & Manke, F. (1995, August). *Concerns about change in the eating and anxiety disorders*. Paper presented at the meeting of the

American Psychological Association, New York.

- Vitousek, K. M. & Ewald, L. S. (1993). Self-representation in eating disorders: A cognitive perspective. In Z. Segal & S. Blatt (Eds.), *The self in emotional distress: Cognitive and psychodynamic perspectives* (pp. 221-257). New York: Guilford Press.
- Vitousek, K. M., & Hollon, S. D. (1990). The investigation of schematic content and processing in eating disorders. *Cognitive Therapy and Research*, 14(2), 191-214.
- Vitousek, K. M., Watson, S., & Wilson, G. T. (1998). Enhancing motivation for change in treatment-resistant eating disorders. *Clinical Psychology Review*, 18(4), 391-420.
- Walsh, B. T. (2004). The future of research on eating disorders. *Appetite*, 42(1), 5-10.
- Ware Jr, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Medical care*, 34(3), 220-233.
- Weidensaul, S. (2007). *Of a feather: A brief history of American birding*. Orlando: Harcourt Books.
- Wheelwright, S., Baron-Cohen, S., Goldenfeld, N., Delaney, J., Fine, D., Smith, R., et al. (2006). Predicting Autism Spectrum Quotient (AQ) from the Systemizing Quotient-Revised (SQ-R) and Empathy Quotient (EQ). *Brain Research*, 1079(1), 47-56.
- Wickwire, J. (1998). *Addicted to Danger*. New York: Pocket Books.
- Williamson, D. A., Gleaves, D. H., & Stewart, T. M. (2005). Categorical Versus Dimensional Models of Eating Disorders: An Examination of the Evidence. *International Journal of Eating Disorders*, 37(1), 1-10.

- Wilson, G. T. (2010). Eating disorders, obesity and addiction. *European Eating Disorders Review, 18*(5), 341-351.
- Yates, A., Leehey, K., & Shisslak, C. M. (1983). Running - an analogue of anorexia? *The New England Journal of Medicine, 308*(5), 251-255.
- Zucker, N. L., Losh, M., Bulik, C. M., LaBar, K. S., Piven, J., & Pelphrey, K. A. (2007). Anorexia nervosa and autism spectrum disorders: Guided investigation of social cognitive endophenotypes. *Psychological Bulletin, 133*(6), 976-1006.