

**RESEARCH
ARTICLE**

Who Sees UFOs? The Relationship Between Unidentified Anomalous Phenomena Sightings and Personality Factors

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HIGHLIGHTS

A new study finds that witnesses of unidentified anomalous phenomena in the general public are neither neurotic nor especially vulnerable to perceptual or cognitive errors, and their reports often parallel those of military witnesses.

ABSTRACT

Unidentified Anomalous Phenomena (UAP) have become a serious topic in the US Congress, and new legislation has been released outlining a plan for declassification for the public. There are numerous factors that could lead an individual to mistakenly think they saw a UAP, including the proclivities of the personalities that observe what they think to be a UAP. This study examined the big five personality traits: extraversion, neuroticism, openness, agreeableness, and conscientiousness, as well as schizotypy traits, to see if UAP experiencers could be distinguished from people who had not seen a UAP. The study included 206 participants, with 103 people who self-reported to have seen a UAP. Latent profile analysis was conducted on the personality variables to explore the grouping of participants. Group one was average on the traits, a second cluster was labeled as the Neurotic/Schizotypy group, which was high in neuroticism and schizotypy traits, and a third group was labeled as O-ACE, which were high on openness, agreeableness, conscientiousness, and extraversion but low on neuroticism and schizotypy traits. The findings indicated that the O-ACE group was more likely to see UAP, but this effect was not strong. A presumptuous stereotype exists in the general public that people who see UAP are probably people who are emotionally reactive (neurotic) and vulnerable to perceptual and cognitive abnormalities, but this was not evident in our data. We also found that the descriptive UAP accounts by the general public were similar to the descriptions provided by military witnesses. It was also of note that only 28% of participants reported their sightings anywhere, and 14% used a UFO reporting organization, which suggests that events are vastly underreported. Stigma and a lack of places to legitimately report sightings appeared to be primary barriers. The conclusion of this study is that personality factors are an insufficient explanation for most UAP sightings.

KEYWORDS

Unidentified anomalous phenomena, personality, schizotypy, stigma, unidentified flying objects.



INTRODUCTION

The Unidentified Anomalous Phenomena (UAP) Disclosure Act of 2023 defined UAP as “any object operating or judged capable of operating in outer space, the atmosphere, ocean surfaces, or undersea lacking prosaic attribution” (p.10). This legislation has been created because it has come to the attention of the United States Congress that there could be governmental and private organizations holding UAP material not within the oversight of Congress and the records that have not been declassified partially due to the misuse of restrictions under the Atomic Energy Act of 1954 (UAP Disclosure Act of 2023). The proposed legislation has emerged in the context of numerous events since 2017 (Cooper et al., 2017a,b). There have been three public congressional hearings regarding UAP (Committee on Oversight and Accountability, 2023; House Intelligence, 2022; U.S. Senate Committee Armed Services, 2023), two public reports (Office of The Director of National Intelligence, 2021; Office of The Director of National Intelligence, 2022) and one briefing by the National Aeronautics and Space Agency (NASA Video, 2023).

In June 2023, David Charles Grush from the National Reconnaissance Office, the National Geospatial-Intelligence Agency, and the UAP Task Force told the public that there have been multiple recovered UAPs, with the earliest being in 1933 (Kean & Blumenthal, 2023). His accusations, based on four years of investigation, have since been deemed by the Inspectors General as credible and in need of urgent attention (Kean & Blumenthal, 2023). The evidence that has led to these assertions has not yet been made public at the time of this publication. But whatever it is, it must be sufficiently compelling to have triggered the US Congress members, the Inspector General (Compass Prose Legal Group, 2023), and numerous pilots (Committee on Oversight and Accountability, 2023) to take such a firm and public stance on a topic that has been mired by substantial stigma, ridicule, and disbelief.

Prior psychological research (Swami et al., 2011) shows that belief in extraterrestrial life can be predicted by individual differences in personality and a tendency toward unusual perceptual experiences. Could it be that the allegations of UAP sightings are by a small minority of people who are extremely high on openness personality traits and have a tendency towards atypical perceptions that lead them to think they have seen something when, in fact, it might be prosaically explainable? Such a conclusion seems unlikely given the high caliber of witnesses currently coming forward, but it is the current status-quo hypothesis from an individual-differences research perspective. This study aims to re-examine this hypothesis

by comparing the personality characteristics of people who have and have not had a self-reported sighting of a UAP, as the predictors of belief might not equally predict sightings. This study also aims to gather data on the extent to which UAP sightings go under-reported.

Background & Context

The term UAP, in both an academic and public context, has been a relatively recent addition. Most typically, UAPs have historically been referred to as Unidentified Flying Objects (UFOs), but this term is now regarded as inadequate for describing the entirety of what is observed. Many UFOs are not reported to be ‘objects’ but something more indescribable to the witnesses and can co-occur with paranormal or parapsychological effects. Hence, the term *Unidentified Ariel Phenomenon* has been used. However, many UFOs have been observed underwater and are referred to as Unidentified Submerged Objects (USO); hence, some documents have used the term Unidentified Ariel and Undersea Phenomenon (UAUP) to encompass both areas. But that term excludes upper and outer atmosphere observations. Therefore, the current parlance takes into account all of the potential domains of observation, hence the term Unidentified Anomalous Phenomena as defined above. The term UAP will be used below irrespective of what was used in the original source referenced to aid readability and to be consistent with the proposed legislation (UAP Disclosure Act of 2023) unless it is the name of a group with UFO in the title or a participant’s direct comment.

In 2021, YouGov (Nolsoe, 2021) conducted a survey about alien belief in the UK and found that 49% of people thought it was likely that the UK government knows more about UAP than they are revealing. The findings also indicated that 7% of people believe that they have seen a UAP, which equates to approximately 4.7 million people in the UK. Although this may seem like a large number of people, there are numerous terrestrial prosaic reasons why someone might be wrong about what they think they saw. The following is not an exhaustive list, but many of the following factors can lead to a misidentification of objects. Humans can make errors by perceiving an object to be moving fast when it is not (Kang et al., 2008); we can perceive time as slowing down due to shock, danger, and/or anxiety (Ahmadi et al., 2019). Psychotic processes, including hallucinations (Moskowitz et al., 2019), delusions (Connors, 2015), and paranoid tangential thinking, do not exclusively occur in those who have a mental health diagnosis. Sleep paralysis (Sharpless & Doghramji, 2015) is a well-documented potential factor that can explain some accounts of alien abductions (Clancy, 2005; McNally &

Clancy, 2005; McNally et al., 2004). Hypnosis has been known to create false memories (Robertson, 2013; Robin et al., 2018). Human memory is prone to various cognitive errors that can lead to false beliefs or memories (Loftus, 2003; McGaugh, 2003). Some people score very highly on measures of gullibility and suggestibility (Preece & Baxter, 2000), which would increase the chances that they believe an atypical interpretation of an experience. Confirmation bias (Kappes et al., 2020) is the process by which an individual unintentionally recalls information that is congruent with their prior knowledge. Thus, people end up seeing what they think is there, not what is objectively there. Another potential terrestrial explanation for UAP sightings is that there is something about the personality characteristics of experiencers that make them more prone to believing that they have seen a UAP.

Swami and colleagues (2011) explored what personality traits were most evident in people who believed in extraterrestrials (UAP had not become common vernacular at the time of their work). Their study included 422 participants and the following measures: Extraterrestrial Belief Scale (Swami et al., 2009), Australian Sheep-Goat Scale (Lange & Thalbourne, 2002) to measure paranormal beliefs, the superstitious beliefs scale (Wiseman & Watt, 2004), Oxford-Liverpool Inventory of Feeling and Experiences (O-LIFE) (Mason et al., 1995) to measure schizotypy traits and the NEO-Five Factor Inventory (Costa & McCrae, 1992) to measure individual differences in personality. They found significant but small effect sizes indicating that people who believe in alien visitation and a cover-up were more likely to be high in paranormal beliefs, schizotypy, and openness traits but lower in educational attainment, extraversion, and agreeableness. Hierarchical regression indicated that paranormal and superstitious beliefs accounted for 32% of the variance in belief in alien visitation, followed by schizotypy (5%) and the Big-5 personality factors (1%). Based on these findings, they concluded that belief in extraterrestrials is statistically expected in those who are high on openness, believe in the paranormal, have had less education, and are prone to unusual perceptual experiences. However, such conclusions should be regarded as tentative given the small effect sizes and the fact that no effort was made to see if their sample included anyone who actually believed they had had a sighting of UAP. Therefore, no conclusion can be made regarding whether or not UAP sightings could be partly explained by the intrinsic personality characteristics of the witness.

This study aims to analyze whether or not it is a particular kind of personality profile that increases the chances of claiming to have seen a UAP. This will be achieved by examining the statistical correlations be-

tween UAP sightings and the personality characteristics of the witnesses, as well as the patterns observed in a latent profile analysis. Latent profile analysis is a modeling technique for extracting unobserved latent groupings in data. These class memberships can then be used in other statistical analyses as independent or dependent variables. The emphasis in latent profile analysis is to determine the number of clusters underlying the data (through statistical and model fit criteria) and the interpretability of the cluster solution. Latent profile analyses have been used many times (Espinoza et al., 2020) to study 'Big Five' personality data to extract "kinds"/ "groups," and typically, three clusters are extracted. By using these clusters in this study, the purpose will be to explore whether or not particular kinds of people clustered on individual differences that can be used to predict whether or not someone has had a self-asserted sighting of a UAP. This study will also represent an opportunity to gather information on what types of UAP objects the general public has seen and to compare them to the publicly available data on military witness sightings provided by the All-domain Anomaly Resolution Office (AARO) (U.S. Senate Committee Armed Services, 2023). It will also provide data on the frequency of reporting and the reasons they do not report their UAP sightings.

METHOD

Participants

The original data set consisted of 246 cases, but 41 were removed due to extensive missing data. These were likely to be cases in which people clicked on the link but did not fill out any of the measures. These cases were removed, and the remaining sample consisted of 206 participants with an even split between the proportion that had and had not had sightings. No efforts were made to attempt an even split in the data. The frequency of ages was as follows: 26 were 18-24, 29 were 25-34, 53 were 35-44, 54 were 45-54, 32 were 55-64, and 12 were older than 65. The majority were male (129), and the majority had a degree (17 GCSE, 56 A-Level, 65 Bachelor Degree, 36 Masters Degree, 11 Doctoral Degree, 13 Diploma, and eight other degrees¹). Exactly half the sample had a self-reported sighting of a UAP ($n=103$). The participants were gained via "UFOTwitter" as this was felt to be the largest online group involved/interested in the topic that could anonymously contribute to the research. Local UAP interest groups were not of sufficient size and may over-represent the frequency of sightings in their sample, and a sample of the general population may not yield a sufficient sample of people with sightings. UFOTwitter provided access to potential participants with and without sightings in a

manner commensurate to the limited resources at the researcher's disposal.

Materials

Extra-terrestrial Belief: Extra-terrestrial Belief Scale (Swami et al., 2009). The extra-terrestrial belief scale (EBS) consists of 37 items that measure three dimensions of extra-terrestrial beliefs: alien visitation/cover-up, scientific search, and general belief. Respondents were asked to rate each statement on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree". Item examples of the alien visitation and cover-up items include; *"The government of this country is covering up the existence of extra-terrestrial life"* and *"Unidentified flying objects (UFOs) observed in the skies are in fact sightings of the spacecraft of intelligent extra-terrestrials"*. Item examples of the scientific research subscale include; *"The search for extra-terrestrial life is a serious and important scientific endeavor"* and *"Governments should direct more funding to the scientific search for extra-terrestrial life"*. Item examples of the alien visitation subscale include; *"Given the size and age of the universe, it is very likely that extra-terrestrial life must exist"* and *"If earth-like planets exist in the universe, then it is likely that earth-like organisms will have evolved on those planets."* The measure produces a total score between 37 to 259, with a score of 37 representing respondents with little or no belief in extra-terrestrial life. A score of 259 indicates a high level of belief in extra-terrestrial life. The EBS has an acceptable level of reliability ($\alpha = 0.75 - 0.90$); this is consistent with previous research and provides evidence that the EBS is correlated with extra-terrestrial beliefs (Swami et al., 2009). This measure was chosen because it was the same dependent variable used by Swami et al. (2011).

Personality: Big Five Inventory (John, Donahue, & Kentle, 1991). The Big Five Inventory (BFI) comprises 44 items measuring the five dimensions of personality: extraversion, agreeableness, conscientiousness, neuroticism, and openness. Respondents must rate each statement on a seven-point Likert scale, ranging from "strongly disagree" to "strongly agree" regarding how much each item is or is not congruent with how they see themselves. Each personality dimension is represented by eight to ten statements. Item examples of extraversion include; *"is full of energy"* and *"generates a lot of enthusiasm."* Item examples of agreeableness include; *"is helpful and unselfish with others"* and *"has a forgiving nature."* Item examples of conscientiousness include; *"does a thorough job"* and *"perseveres until the task is finished."* Item examples of the neuroticism subscale include; *"is depressed, blue"* and *"worries a lot."* Item examples of the openness sub-

scale include; *"is original, comes up with new ideas"* and *"is ingenious, a deep thinker."* The BFI has acceptable reliability (Internal consistency of $\alpha = 0.75 - 0.80$, test-retest reliability of $r = 0.80-0.90$). The BFI scores are correlated with other psychometrically sound measures of the Big Five factors, showing high construct validity (Worrell & Cross, 2011). This measure was chosen over the NEO-5 because it is free and shorter but still has acceptable psychometric properties.

Schizotypal Personality Questionnaire-Brief Revised (Davidson et al., 2016). The Schizotypal Personality Questionnaire-Brief Revised and Updated (SPQ-BRU) consists of 32 items to measure schizotypal personality. It measures the four schizotypal symptoms: interpersonal, cognitive-perceptual, disorganized, and social anxiety. This shortened questionnaire was derived from the original Schizotypal Personality Questionnaire (which contains 74 items) in order to improve specificity. Respondents are asked to rate each statement on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree," resulting in a total score between 32 and 160. Item examples of the cognitive-perceptual subscale include; *"Do you sometimes feel that people are talking about you?"* and *"I often feel that others have it in for me."* Item examples of the interpersonal subscale include: *"I find it hard to be emotionally close to other people"* and *"I tend to keep my feelings to myself."* Item examples of the disorganized subscale include; *"I am an odd, unusual person"* and *"I have some eccentric (odd) habits."* Item examples of the social anxiety subscale include; *I get anxious when meeting people for the first time"* and *"I feel very uncomfortable in social situations involving unfamiliar people."* A score of 32 indicates few or no schizotypal traits, while a score of 160 indicates that the respondent possesses numerous schizotypal traits. The SPQ-BRU has an acceptable degree of reliability (Internal consistency of $\alpha = 0.93$) and is, therefore, significantly correlated with the original SPQ. Furthermore, the SPQ-BRU scores are correlated with other psychometrically sound measures of schizotypy, demonstrating evidence of construct validity (Asan & Pincus, 2023). This measure was chosen to explore if more pathological levels of schizotypal presentation were evident in the population group.

Additional Variables

The following questions were created for this study to measure UAP sightings and the frequency of reporting. *"Have you ever witnessed/experienced a UAP before? If you are unsure whether what you have experienced was a UAP, please select 'Yes' and leave a description of your experience below."* If they clicked Yes, they were asked to provide a

Table 1. Descriptive Statistics and Missing Data Across Subscales

Measure	Subscale	N	Mean	Median	SD	Variance	Min	Max	One Missing Data Points	Two Missing Data Points
Extraterrestrial Beliefs Scale	Belief in Alien Visits	206	4.33	4.45	1.06	1.14	1.09	6.45	2	1
	Belief in Scientific Search	206	4.12	4.16	.62	.39	1.00	5.5	6	0
	General Alien Belief	206	3.88	4.00	.52	.27	1.5	5.83	2	0
Big-5	Extraversion	196	31.55	32.00	9.53	91.00	9.00	56.00	4	0
	Agreeableness	196	46.28	46.00	6.87	47.27	24.00	63.00	7	0
	Conscientiousness	195	43.98	43.87	8.94	80.09	22.00	62.00	2	0
	Neuroticism	195	30.02	29.00	9.92	98.50	8.00	57.00	2	0
	Openness	196	53.39	53.00	7.80	60.87	23.00	70.00	5	0
Schizotypy	Total	194	82.88	83.00	20.87	435.83	11.60	139		
	Social	194	12.26	13.00	4.67	21.85	4.00	20.00	1	0
	Cognitive-perception	194	33.09	33.00	9.40	88.47	14.00	59.00	1	0
	Interpersonal	194	14.48	14.00	5.45	29.73	6.00	29.00	0	0
	Disorganised	194	23.34	24.00	7.61	57.93	8.00	40.00	1	0

brief description of what they observed. This open-ended question meant that no restraints were placed on what they described. Participants were provided with a definition of UAP in the information sheet; therefore, they were aware of what a UAP was before admitting to whether or not they had seen one. They were also asked if they reported their experience anywhere. If yes, then where did they report it? If No, why didn't they report the experience? The options they were given for reporting were Police, National UFO Reporting Centre, Mutual UFO Network, Swansea UFO Network, Birmingham UFO network, and Other [open text box].

Procedure

Ethical approval was granted by the Cardiff Metro-

politan University Psychology Ethic Panel (Approval number UG-7287). The measure items were created on Qualtrics (2023) and released via Twitter (now X) on the lead authors' account (Stubbings, 2023) on the 16th of March, 2023, at 6:03 AM. The tweet read, "Participants needed for a research project into UFO/UAO. Everyone with or without a sighting needed," and it was retweeted by 63 accounts and viewed a total of 30,300 times. There was no time limit, and participants could stop at any time. They were not able to withdraw their data due to the method of data collection. Participation was voluntary and not compensated. Once the data was collected, it was analyzed with the aid of SPSS software, JASP (JASP Team, 2023), and Mplus 8 (Muthén & Muthén, 1998-2017). Data collection began on 16.03.2022 and was closed on 28.03.2023 because the

Table 2. Correlation matrix of study variables.

	UAP sighting	UAP reporting	Belief in Alien visitation	Belief in Scientific Search	General Alien Beliefs	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness	Schizotypy	Gender	Age	Education
UAP sighting	1													
UAP reporting	. ^a	1												
Belief in Alien visitation	.29***	.13	1											
Belief in Scientific Search	.16*	.15	.36***	1										
General Alien Belief	-.06	-.06	.07	.28***	1									
Extraversion	.03	-.06	-.06	.08	.04	1								
Agreeableness	.15*	.11	.25***	.02	.03	.20**	1							
Conscientiousness	.20**	.15	.10	.12	.01	.14*	.32***	1						
Neuroticism	-.22**	.01	.05	.06	.05	-.29***	-.32***	-.39***	1					
Openness	.23***	.19	.02	.13	.02	.26***	.22**	.15*	-.17*	1				
Schizotypy	-.07	.09	.16*	.07	.10	-.44***	-.35***	-.38***	.54***	-.07	1			
Gender	-.11	.07	-.01	-.11	-.01	-.06	.06	-.05	.06	-.14	.04	1		
Age	.30***	.09	.14	.10	-.06	.09	.20**	.31***	-.25***	.33***	-.28***	.14*	1	
Education	-.12	-.14	-.34***	-.04	.08	.07	-.16*	.05	-.15*	.13	-.10	.01	-.02	1
N	196	98	206	206	206	196	196	195	195	196	194	200	206	185

Note. *** $p < .001$, ** $p < .01$, * $p < .05$. ^aA correlation cannot be computed because one of the variables is a constant. Age and education are ordinal variables. Age values are 1=18-24, 2=25-34, 3=35-44, 4=45-54, 5=55-64, 6=65+. Education values are 1=GCSE, 2=A-level, 3=bachelors degree, 4=masters degree, 5=doctoral degree.



Table 3. Places Sightings Were Reported.

Place of Reporting	Number
Mutual UFO Network	11
Twitter/X	4
National UFO Reporting Centre	2
Yorkshire UFO Society	1
Unspecified social media claiming to be investigative reporters	1
Local Church	1
Online to other experiencers	1
To a psychology professor in the US	1
Reddit	1
Local News paper	1
BBC Newsroom	1
Other-No comment	1
Somewhere, cannot recall	1

student had obtained enough participants for the desired power, and the response frequency had dramatically reduced to the point that additional data became unlikely.

RESULTS

Descriptive Statistics, Missing Data & Correlation Matrix

For the final sample of 206, there was some missing data; the details are provided in Table 1. For cases in which an item was missed, the total score was obtained by dividing the total score for the missing case subscale and multiplying it by the total score for the subscale. For example, if the subscale had nine items but only eight were present, then the total was divided by eight and multiplied by nine so that total scores were equivalent across the limited array of missing data points. The correlation matrix between variables is provided in Table 2.

Sightings

Of the 206 participants, 103 had sightings, with a total of 132 sightings across the group (some had multiple sightings in their descriptions), but only 27 (26%) reported it anywhere, and only 14%² Reported it to a UAP reporting group- see Table 3. The reasons for not reporting were provided by participants in an open text box, reviewed, and placed into categories. For the 103 with sightings, 82 provided reasons for not reporting. The primary reason

Table 4. Comparison to ARRO Data and Qualitative Examples

Shape of Object	Comparative Military Witnesses Group (ARRO)	Current Study	Qualitative Example of Some Participants
Orb/Round/Sphere	52%	26%	"An orb, like a mirror ball the size of a basketball dropped down (as if falling from straight overhead) in front of my car one night and before it hit the road in front of me, right when it was illuminated by my headlights, it froze 6-8 feet from the ground, hesitated for a moment and then shot straight back up into the sky so fast it left a streak"
Oval	3%	-	
Star-Like/Undefined Lights		30%	"Was out star watching on a clear night in May, on our farm...A short while later, a bright object came from the south. Very similar to a satellite, which I observe regularly. As it passed over me, it stopped, flared up brighter than anything else in the sky and then headed back in the direction it came from."
Lights	5%		
Uncharacterized		17%	"My wife and I were outside in our backyard one night for a few hours having a fire in the summer of 2020... She pointed up and asked "what is that?". I looked up and saw something I can't explain to will. It was hovering, was lit up in a reddish color, and didn't look like anything else I've ever seen. It was there for a few minutes and then left. We both were fascinated by it and couldn't look away. I've tried to rationalize it by thinking it was a drone but parts of it moved in ways that nothing else I've seen could do"
Ambiguous Sensor ¹	23%	-	N/A
Tic-Tac/Cylinder	3%	3%	"I saw a white cylinder in the sky during the day with clear skies, and I watched it just disappear and was unable to find it anywhere in the sky." "I saw a large, completely silent, completely black, cigar shaped object glide through the sky. It was darker than even the night sky around me and made absolutely no noise. I watched it for a few seconds until it disappeared past trees and out of view."
Disk	2%	5%	"The most spectacular was a saucer shaped craft the size of a football field. I watched it come down the valley moving directly over me, it wouldn't have been more than 200 meters above me. It carried on up the next valley moving quite slowly. It had revolving different colored lights on the edge. It made no sound. This happened at 4 o'clock in the morning and was witnessed by several farmers in the area." "One evening.... I was looking at the [the night sky] and I thought I was seeing a helicopter on approach but the luminosity diminished until a dark, disc-like silhouette appeared. This appeared to slow, then accelerate eastward, abruptly change direction (at approx. 45 degrees), accelerate again, then change direction at 90 degrees, before accelerating rapidly, seemingly outside the atmosphere."
Triangle	1%	10%	"A huge, jet black, perfect triangle moving silently, partially submerged moving just off the coast of a very remote part of It followed the coastline, in very rough seas but wasn't being affected by the wind or rough condition. It just moved smoothly and silently."
Square	1%		"A giant black triangle hovering silently above a field opposite our house about a 100 meters away. It was approx. 30 meters from the ground and had a bright white/orange light at each corner."
Rectangle	1%	3%	"Truck-size black rectangle flying low and slow over the suburbs."
Polygon	1%	0%	"I witnessed a flying gold/bronze cube shape while driving on a busy street" N/A
Other	-	6%	"White metallic egg shaped UFO approximately 6 meters in length, 200 meters away ascending silently from behind a hill. Developed a blue aura, faded and disappeared." "Driving home...observed a stationary metallic pyramid-shaped craft at approx. 20,000ft, clear blue sky, observed for 15 minutes."

¹ ARRO gave no definition of how "Ambiguous Sensor" was defined but it was used as a category, hence its inclusion here.



Table 5. UAP sightings and reporting by education, age, and gender.

	UAP sighting		UAP reporting	
	No	Yes	No	Yes
Total	103 (50%)	103 (50%)	76 (73.8%)	27 (26.2%)
Education				
GCSE	5 (29.4%)	12 (70.6%)	8 (66.7%)	4 (33.3%)
A-level	29 (51.8)	27 (48.2%)	19 (70.4%)	8 (29.6%)
Bachelors degree	32 (49.2%)	33 (50.8%)	25 (75.8%)	8 (24.2%)
Masters degree	22 (61.1%)	14 (38.9%)	10 (71.4%)	4 (28.6%)
Doctoral degree	6 (54.5%)	5 (45.5%)	5 (100%)	0 (0%)
Other	4 (50%)	4 (50%)	2 (50%)	2 (50%)
Collage/diploma	5 (38.5%)	8 (61.5%)	7 (87.5%)	1 (12.5%)
Age				
18-24	23 (88.5%)	3 (11.5%)	3 (100%)	0 (0%)
25-34	14 (48.3%)	15 (51.7%)	9 (60%)	6 (40%)
35-44	28 (52.8%)	25 (47.2%)	21 (84%)	4 (16%)
45-54	22 (40.7%)	32 (59.3%)	24 (75%)	8 (25%)
55-64	12 (37.5%)	20 (62.5%)	15 (75%)	5 (25%)
65+	4 (33.3%)	8 (66.7%)	4 (50%)	4 (50%)
Gender				
Male	56 (46.3%)	65 (53.7%)	52 (74.3%)	18 (25.7%)
Female	40 (58%)	29 (42%)	20 (69.0%)	9 (31.0%)

for not reporting the sightings was that they did not know where to report it 25% (21), followed by stigma 18% (15), or didn't see the point 15% (13). Other reasons for not reporting included being too young 7% (6), didn't realize it was anomalous at the time 7% (6), experience was too fleeting 7% (6), didn't have any evidence after it 6% (5), didn't occur to them 5% (4), was dismissed when they did tell people 4% (3), thought it was a personal experience just for them 3% (2) and 4% (3) gave other reasons that didn't fit a category.

Participants with a self-reported UAP experience were provided with an open text box to describe what they witnessed. All of the accounts were reviewed and classified into categories. Most participants described one sighting, but some had up to four. Table 4 provides the percentages of sightings of different types of objects provided by AARO's cohort of data (U.S. Senate Committee Armed Services, 2023) comprised of military witnesses and compares these to the characterization of sightings

in this cohort. Approximately 56% of the sightings can be characterized as orb/round/sphere/star-like/lights, and this is comparable to the 60% observed in the AARO data. The frequencies for other shapes, such as triangles, discs, and cubes, are also comparable to the AARO data. For the uncharacterized group, these were accounts for which the shape wasn't noted or was undefinable to the observer. Examples of this included "small cloud changing direction at low altitude," "a woman changing appearance then floating off," "shapes transforming," and "massive object with three levels." For the category "other," these included other objects that were only mentioned once: cross, pyramid, donut-shaped, and a boomerang shape. Four of the participants reported witnessing some kind of non-human intelligence being.

Predicting UAP Sightings

Chi-square tests were performed to examine if UAP

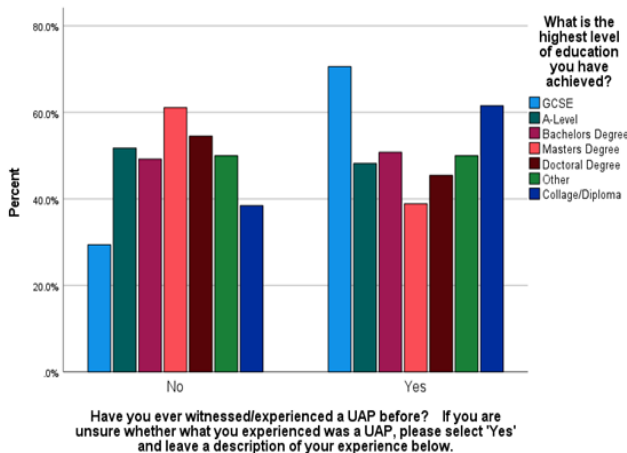


Figure 1. UAP sightings and Education.

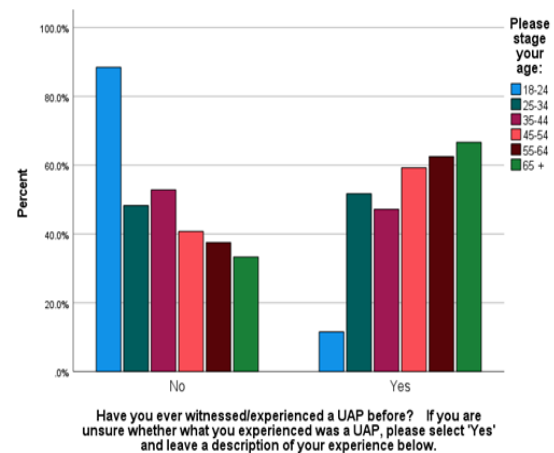


Figure 2. UAP sightings and Age.



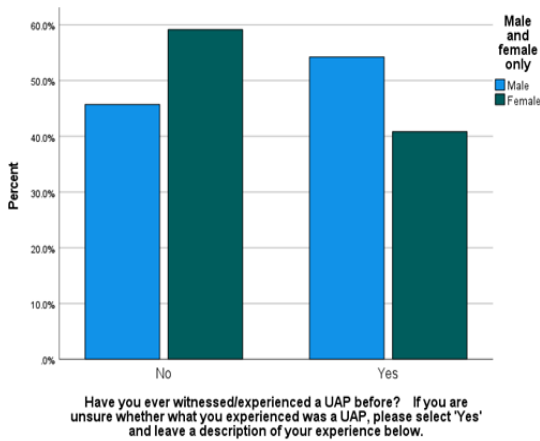


Figure 3. UAP sightings and Gender.

sightings vary by education (Figure 1), age (Figure 2), and gender (Figure 3). UAP sightings did not differ (Yes/No) across levels of education³ $\chi^2(6) = 5.53, p = .48$ – GCSE (12/5), A-Level (27/29), Bachelors Degree (33/32), Masters Degree (14/22), Doctoral Degree (5/6), Other (4/4), College/Diploma (8/5). UAP sightings did significantly differ across age categories $\chi^2(5) = 20.77, p < .001$, and inspection of the residuals indicated that fewer (11.5%) of 18-24-year-olds (3= Yes, 23= No) reported UAP sightings than other age groups: 25-35-year-olds (15/14, 51%), 35-44 year olds (25/28, 47%), 45-54-year-olds (32/22, 62%), and 65+ year olds (8/4, 66%). The frequency of UAP sightings did not significantly differ across genders: $\chi^2(1) = 3.30, p = .07$ – male (Yes= 70 No= 59), female (29/42). People who have had a self-reported sighting of a UAP were statistically more likely to believe that alien visitation has occurred ($r(204) = -.268, p < .001$), and more scientific research should be done ($r(204) = -.142, p = .042$). In summary, UAP sightings did not differ by education or gender but are less frequently seen by the youngest age group, 18-24 year olds. Overall frequency and percentag-

es are provided in Table 5.

A logistic regression analysis was performed predicting UAP reporting from education, gender, and age. The dependent variable was UAP reporting, coded 1 for “yes” and 0 for “no”. The results (Table 6) indicated the overall model was not significantly better than a null model with no predictors $\chi^2(8) = 6.294, p = .614$, and none of the predictors were significantly related to UAP reporting.

Correlations Between Personality Variables and Sightings

Each of the personality variables (Big-5 and schizotypy) and the subscales of the extra-terrestrial beliefs subscales were normally distributed. Having a sighting of a UAP was significantly correlated with higher scores on agreeableness ($r = .152, p = .033$), conscientiousness ($r = .195, p = .006$), neuroticism ($r = -.221, p = .002$), and openness ($r = .227, p = .001$) but these were weak correlations with significant personality traits only explaining 2.3%-5.1% of the variation in UAP sightings. UAP sightings and extraversion were not significant ($r = .029, p = .685$).

A logistic regression analysis was performed predicting UAP sighting from big five personality variables and schizotypy (see Table 7). The dependent variable was having a UAP sighting, coded 1 for “yes” and 0 for “no”. The overall model with predictors was significantly better than a null model with no predictors, $\chi^2(6) = 22.343, p < .001$. The results indicated when controlling for one another, only neuroticism ($b = -.44, p = .023$) and openness ($b = .421, p = .013$) significantly related to having a UAP sighting (Tjur $R^2 = 11.3%$) (Allison, 2014). Neuroticism is negatively related to having a UAP sighting (odds ratio = .644), meaning that for every 1 standard deviation increase in neuroticism, the odds of having a UAP sighting decrease by 35.6%. Openness is positively related to hav-

Table 6. Logistic Regression Predicting UAP Reporting from Education, Gender, and Age.

Predictor	b	Standard error	Wald	p	Exp(b) Odds Ratio	95% CI Odds Ratio
Intercept	-2.022	1.153	3.075	.080	.132	
Education: GCSE	.722	.818	.780	.377	2.059	[.415, 10.226]
Education: A-level	.639	.633	1.016	.313	1.894	[.547, 6.556]
Education: Masters	.539	.764	.498	.480	1.715	[.383, 7.670]
Education: doctoral	-19.802	20059.267	0	.999	.000	[0, ∞]
Education: other	1.301	1.106	1.384	.239	3.673	[.420, 32.085]
Education: college/diploma	-.474	1.191	.159	.690	.622	[.060, 6.428]
Gender	.27	.550	.242	.623	1.311	[.446, 3.850]
Age	.079	.203	.150	.698	1.082	[.727, 1.611]

Note. N=196. Dependent measure “UAP reporting” coded 0=no, 1=yes. The omitted reference category for the dummy coded education variables is bachelor’s degree. Gender coded 1=male, 2=female. * $p < .05$.

Table 7. Logistic Regression Predicting UAP Sighting from Personality and Schizotypy.

Predictor	<i>b</i>	Standard error	Wald	<i>p</i>	Exp(<i>b</i>) Odds Ratio	95% CI Odds Ratio
Intercept	.008	.152	.003	.957	1.008	[.748, 1.359]
Extraversion	-.132	.177	.559	.455	.876	[.620, 1.239]
Agreeableness	.112	.169	.443	.506	1.119	[.804, 1.558]
Conscientiousness	.253	.173	2.134	.144	1.287	[.917, 1.807]
Neuroticism	-.440*	.193	5.190	.023	.644	[.441, .940]
Openness	.421*	.169	6.223	.013	1.524	[1.094, 2.121]
Schizotypy	.196	.202	.937	.333	1.216	[.818, 1.807]

Note. *N*=196. Dependent measure “UAP sighting” coded 0=no, 1=yes. **p*<.05. Predictors are centered.

ing a UAP sighting (odds ratio = 1.524), meaning that for every one standard deviation increase in openness, the odds of having a UAP sighting increase 52.4%.

Because odds ratios reflect a ratio of odds ($(p_1/q_1)/(p_2/q_2)$), and odds are also a ratio (p/q) of an event occurring (p) relative to an event not occurring ($1-p: q$), the probability implications of odds ratios can be difficult to grasp (Lieberman, 2005). Additionally, odds ratios are often misinterpreted as direct estimates of changes in probabilities, which is incorrect (i.e., as risk ratios). Fortunately, odds ratios have direct relationships to probabilities and can be calculated using the logistic model assuming values for the predictors (Menard, 2001, p. 57).

Thus, the model results are more interpretable when expressed as probabilities, assuming values for the predictors. For someone who is average on all predictors, the probability of having a UAP sighting is 50.2%. For someone who has one standard deviation above the mean on neuroticism but is average on all other predictors, the probability of having a UAP sighting is 39.4%. For someone who has one standard deviation above the mean on openness but is average on all other predictors, the probability of having a UAP sighting is 60.6%. Overall, by comparing these probabilities, the results indicate a

1 standard deviation increase in neuroticism decreases the probability of having a UAP sighting by 10.8%, and a 1 standard deviation increase in openness increases the probability of having a UAP sighting by 10.4%. Thus, despite the seemingly large odds ratios, when expressed as probabilities, its demonstrated personality has relatively modest relationships to the probability of having a UAP sighting.

UAP sightings were not significantly related to overall schizotypy ($r = .066, p = .359$). With respect to the schizotypy subscales, people who have had a UAP sighting were significantly less likely to score higher on social anxiety ($r = -.152, p = .034$) and the disorganized subscale ($r = -.163, p = .023$). Cognitive-perceptual ($r = .091, p = .206$) and interpersonal ($r = -.108, p = .134$) subscales were not significant. Significantly related schizotypy traits only explained 2.3%-2.7% of the variation in UAP sightings, indicating these traits are also not strongly related to having a UAP sighting.

These findings suggest that people who have had sightings of UAP are more likely to be high in agreeableness, conscientiousness, and openness and lower in neuroticism, social anxiety, and disorganized traits, but these associations are not strong. Nevertheless, the higher

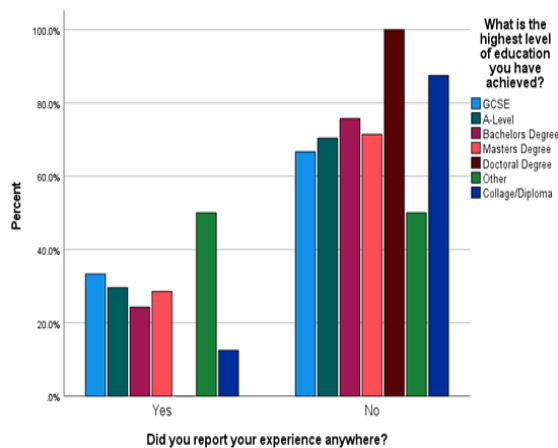


Figure 4. UAP Reporting and Education.

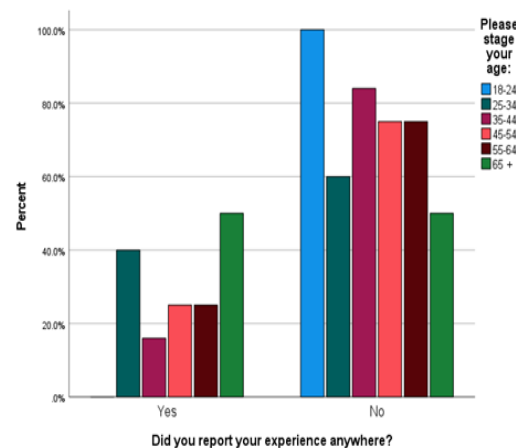


Figure 5. UAP Reporting and Age.



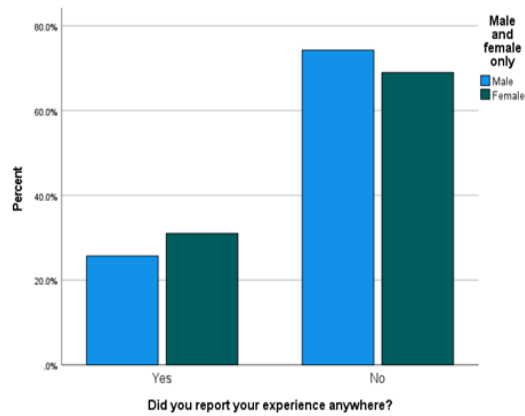


Figure 6. UAP Reporting and Gender.

someone is in openness and low in neuroticism, the more likely they are to have a sighting. Having a sighting of UAP was also associated with a significant weak correlation with a belief in alien visitation ($r = .289, p < .001$) and belief in scientific search ($r = .154, p = .027$), but it was not significant with a general belief in aliens ($r = -.064, p = .364$). These findings suggest that having a sighting of a UAP is not a strong predictor of believing in aliens or thinking that further scientific research into the topic is needed.

Predicting UAP Reporting

Chi-square tests were performed to examine if UAP reporting varies by education (Figure 4), age (Figure 5), and gender (Figure 6). UAP Reporting did not differ across levels of education* $\chi^2(6) = 4.31, p = .64$ - GCSE (Yes [4], No [8]), A-Level (8/19), Bachelors Degree (8/25), Masters Degree (4/10), Doctoral Degree (0/5), Other (2/2), College/Diploma (1/7). UAP Reporting did not differ across age $\chi^2(5) = 6.27, p = .28$ - 18-24-year-olds (Yes [0] No [3]), 25-34-year-olds (6/9), 35-44 year olds (4/21), 45-54-year-olds (8/24), 55-64-year-olds (5/15), 65+ year olds (4/4). UAP Reporting did not differ across gender $\chi^2(1) = .29, p = .59$ - male (18= yes, 52= no), female (9/20). In summary, UAP reporting was not related to education, age, or gender.

Latent Profile Analysis

Number of Latent Classes and Interpretation. Latent profile analysis is a method for detecting unobserved profiles underlying clustering in observed item means and determining profile prevalence. For the present study, latent profile analysis was conducted using *Mplus 8* (Muthén & Muthén, 1998-2017) and estimated using maximum likelihood with robust standard errors (MLR) on six items: the Big Five variables (extraversion, agreeableness, neuroticism, conscientiousness, and openness) and schizotypy. Latent profile analyses have commonly been used with personality data (Espinoza et al., 2020) and have often found three or four profiles underlying Big Five measurements (Alessandri et al., 2014; Specht et al., 2014). As such, we expected a similar number of cluster solutions to underlie these items.

Latent profile analyses were conducted on the six items, extracting one through four class solutions. Best practice recommendations were followed to avoid unstable models with local likelihood maximums by requesting a sufficient number of start values in the first and second steps of optimization (500 and 50 sets, respectively) and using a sufficient number of initial stage iterations (50) (Geiser, 2013). All four class solutions replicated the best loglikelihood value, and the models were rerun with twice the random starts to check the best loglikelihood was still obtained and replicated. Next, the models were examined for a number of criteria (Table 5). The entropy statistic is a summary measure of the quality of classification, with higher values closer to 1 indicating better classification accuracy and lower values closer to 0 indicating lower classification accuracy. Heuristics recommend entropy values of $\geq .60$ or $\geq .80$, but as there is no definitive entropy cutoff criterion (Muthén, 2008), the best model should be selected based on broad consideration of entropy with other criteria. All models had acceptably high entropy values.

More informative are the average latent class assignment probabilities (ALCP) for individuals who were assigned to a specific class. The ALCP matrix indicates the

Table 8. Latent Profile Analysis Results

Models	Entropy	ALCP			Class size % (n)				Model fit criteria		
		AL-CP-D	AL-CP-OD	Class 1	Class 2	Class 3	Class 4	BIC	aBIC	BLRDT	
1 Class	-	1.00	-	100% (196)	-	-	-	3389.329	3351.314	-	
2 Class	.687	.908	.092	45.8% (90)	54.2% (106)	-	-	3275.593	3215.402	LRD= 150.684, df=7, p<.001	
3 Class	.729	.882	.059	14.0% (25)	54.9% (112)	31.1% (59)	-	3275.048	3192.683	LRD= 37.491, df=7, p<.001	
4 Class	.788	.901	.033	50.2% (102)	16.1% (30)	30.9% (59)	2.8% (5)	3289.057	3184.517	LRD= 22.937, df=7, p=.022	

Note. N=196. ALCP = average latent class probability for most likely class membership. ALCP-D: average of the diagonal values. ALCP-OD: average of the off-diagonal values. BIC = Bayesian Information Criterion. aBIC = sample-size adjusted BIC. BLRDT = bootstrap likelihood ratio difference test.



quality of a latent profile analysis solution. Values close to 1 (i.e., $\geq .80$) on the diagonal of the ALCP matrix (ALCP-D) indicate a high precision of the classification because it indicates individuals, on average, are classified with high certainty into their most likely latent class. It is also desirable to have values close to 0 on the off-diagonal of the ALCP matrix (ALCP-OD) because it indicates individuals belonging to that class have a low probability of being assigned to another class (Geiser, 2013; Weller et al., 2020). The average ALCP-D and ALCP-OD are shown in Table 8. All models had high ALCP-D and low ALCP-OD, indicating all solutions had good classification accuracy.

Models were compared using fit criteria and model comparison tests (Table 2). Model fit criteria take into account the goodness of fit of a model to the data and model parsimony and weigh the best model as one that fits well and uses as few parameters as possible. Models with the smallest Bayesian Information Criterion (BIC) or sample-size adjusted Bayesian Information Criterion (aBIC) are preferred (Geiser, 2013). The BIC indicated the 3 class model, while the aBIC indicated the four class model, as the best performing model.

Models were next compared using the bootstrap likelihood ratio difference test (BLRDT) (Table 2). The BLRDT compares a model with G latent classes against a model with $G-1$ classes, and a significant p -value indicates the model with G classes fits the data better than the more parsimonious model with one class less, while a nonsignificant p -value indicates the more parsimonious model with one class less is preferred. The BLRDT was used to compare 1 class to 2 classes ($p < .001$), 2 classes to 3 classes ($p < .001$), and 3 classes to 4 classes ($p = .022$). In all comparisons, the model with more classes was preferred, with the BLRDT ultimately indicating the four class model as the best performing model.

In addition to the above descriptive and statistical criteria, it is also important to consider the size of the classes and the interpretability of the class solutions (Geiser, 2013; Weller et al., 2020). While the four-class model was indicated as better than the three-class model according to the aBIC and BLRDT, its fourth class had a very small membership 2.8% ($n = 5$) which did not seem justifiable beyond a three-class solution. Therefore, upon considering all the above criteria, the three-class model was selected as the best model, and the one-, two-, and four-class models were not considered further.

Figure 7 presents a profile plot of the three-class solution and shows how the three classes differ in their estimated means for the six items. The figure indicates Class 2, which is the largest class with 54.9% of the sample, has values close to 0 across all items. Because the items were standardized, this indicates Class 2 is a cluster

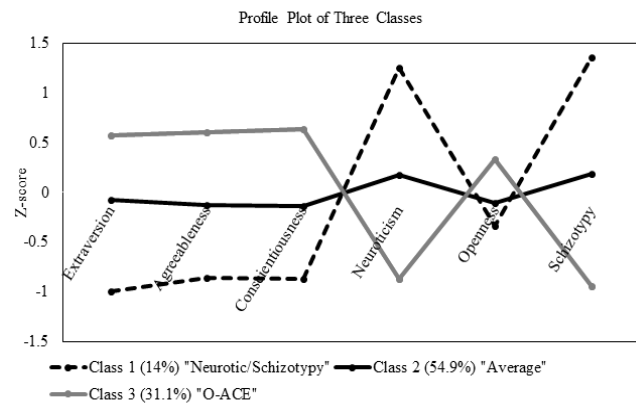


Figure 7. Profile Plot of Three Class Solution.

in which people score about average on all six items and thus reflects “average” people. The next largest class is Class 3, which accounts for 31.1% of the sample. This class is characterized by high extraversion, high agreeableness, high conscientiousness, low neuroticism, high openness, and low schizotypy, and so seems to reflect people with grounded, positive, open, resilient, and emotionally stable characteristics. The remaining class is Class 1, with 14% of the sample, is characterized by low extraversion, low agreeableness, low conscientiousness, high neuroticism, low openness, and high schizotypy, and so seems to reflect people who are temperamentally emotionally reactive, negative, closed, disorganized, and schizotypal. Overall, given the clusters most differ in neuroticism and schizotypy, these characteristics may distinguish Class 3 as “average”, Class 2 as “O-ACE”, and Class 1 as “Neurotic/Schizotypy.” All classes had significantly different means from each other, except for Class 1 “Neurotic/Schizotypy” and Class 3 “average” which had the same openness ($p = .419$).

Investigating Class Differences on UAP Outcomes

Group differences were examined for UAP sightings, UAP Reporting, Belief in Alien Visitation, Belief in Scientific Search, and General Alien Belief. Group differences in UAP outcomes were investigated using the BCH method, which is appropriate for continuous and binary outcomes and is recommended over the three-stage approach for avoiding shifts in latent class in the final stage (Asparouhov & Muthen, 2021). The results indicated the groups significantly differed in UAP sightings (Figure 8), $\chi^2(2) = 6.01, p = .05$. “O-ACE” group (Openness, Agreeableness, Conscientiousness and Extraversion) (64.9%) had significantly higher UAP sightings than “average” group (44.3%), $\chi^2(1) = 4.38, p = .036$, and nearly significantly higher UAP sightings than “neurotic/schizotypy” people (39.4%), $\chi^2(1) = 3.708, p = .054$. “average” and “neurotic/schizotypy”

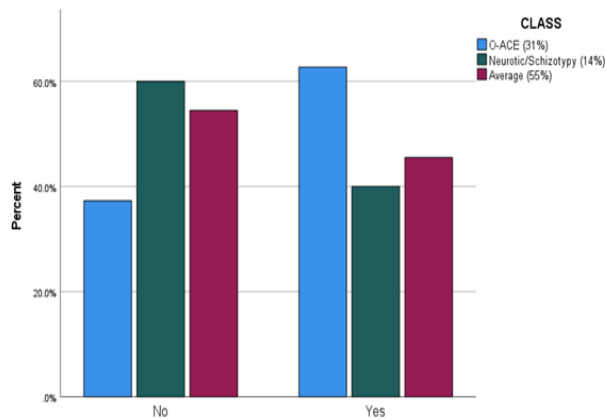


Figure 8. Sightings and Personality Profiles.

group did not differ in their UAP sightings ($p = .72$).

The groups did not significantly differ regarding UAP reporting $\chi^2(2) = .87, p = .65$. That is, for those who had a UAP sighting, “average,” “O-ACE,” and “Neurotic/Schizotypy” participants did not differ overall in their UAP reporting (20%, 30.5%, and 31.6%, respectively). Lastly, the groups did not significantly differ in Belief in Alien Visitation $\chi^2(2) = 1.29, p = .53$, nor Belief in Scientific Search $\chi^2(2) = .84, p = .66$, nor General Alien Belief $\chi^2(2) = .36, p = .84$. In summary, the “O-ACE” personality profile group reported more UAP sightings than the “average” group. The groups did not differ in their frequency of reporting UAPs nor their beliefs or attitudes about UAPs.

To test the generalizability of the results, we also repeated the class differences analyses on the two-class solution, which, while indicated as less optimal than the three-class solution, has more members per class and thus greater power to detect group differences. The two-class solution had two classes, and its profile plot largely resembled Figure 7, absent the “average” participants, who were now classified as either “O-ACE” (54.2%, $n = 106$) or “Neurotic/Schizotypy” (45.8%, $n = 90$). The results remained similar to the above with three classes; “O-ACE” people (62.7%) had significantly higher UAP sightings than “Neurotic/Schizotypy” people (35%) $\chi^2(1) = 10.49, p < .001$, but did not differ in UAP reporting $\chi^2(1) = .03, p = .87$, Belief in Alien Visitation $\chi^2(1) = .42, p = .52$, nor Belief in Scientific Search $\chi^2(1) = .87, p = .35$, nor General Alien Belief $\chi^2(1) = 3.25, p = .08$.

Multiple regressions were next performed using the three personality profile membership variables as predictors of the UAP outcomes. The overall regression models for all five outcomes were not significant (UAP sightings: $\chi^2(2) = 5.75, p = .056$, UAP Reporting: $\chi^2(2) = .87, p = .65$, Belief in Alien Visitation: $F(2, 193) = .537, p = .59$, Belief in Scientific Search: $F(2, 193) = .385, p = .68$, and General Alien Belief: $F(2, 193) = .166, p = .85$). These null results indicate personality profiles do not explain a significant

amount of variance in the outcomes, nor significantly improve model fit beyond a null model. In other words, personality profiles do not seem to “explain” or “predict” UAP outcomes. These findings complement the latent profile analyses above, which found no significant mean differences in UAP outcomes between personality groups, aside from one significant group difference in UAP sightings; the O-ACE group reported higher UAP sightings than average people.

DISCUSSION

To our knowledge, this is the first study to explore the statistical relationship between personality factors and UAP sightings. Firstly, the data indicated that what our participants observed was similar in description and frequency to what military and service personnel reported (Senate Committee Armed Services, 2023). Furthermore, only 14% of sightings get reported to a public database. We did not find that UAP sightings were predicted by education, which is in contrast to the findings of Swami et al. (2011), who found that those who believe in extraterrestrials were likely to be less educated. This could be because Swami et al. had almost twice the sample size of this study and were more able to detect significant small effects, or it could be that education predicts belief, but it does not predict the likelihood of having a sighting. Similar to Swami et al., we found that gender did not predict UAP sightings. Our findings did indicate that younger people were less likely to have seen a UAP. However, this could be somewhat an effect of length of life exposure; the older someone is, the greater the chances that they may have seen something anomalous over the course of their life. Swami et al. found that people who are high in openness are more likely to believe in UAP, and we also found that people who are high in openness are more likely to report having seen a UAP. However, we also found that participants with a sighting were more likely to be high in extraversion, openness, conscientiousness, and agreeableness but low in neuroticism. Unlike Swami et al., (2011), we found that people’s schizotypy traits were not predictive of having had a sighting overall. Again, this points to the characteristics that predict belief in UAP, which may not be the same characteristics that predict having had a self-reported sighting of a UAP.

People who self-reported having had a sighting of a UAP were more statistically likely to believe that alien visitation has occurred and more scientific research should be done, but this was not a strong association. This suggests that for some people who have had a sighting, it has convinced them that a non-human intelligence is self-evident and further research should be done, but for

others, they have not been convinced by that conclusion. It is possible that they think there still could be other explanations, such as advanced secret terrestrial technology not shared with the public. In either case, the stereotype that UAP experiencers generally and easily assume that what they saw must be something controlled by a non-human intelligence is not evident in our data; many are very critical of what they think they have seen.

The data also revealed that the participants could be classified into the following groups: O-ACE witnesses (high on openness, agreeableness, conscientiousness, and extraversion but low on neuroticism and schizotypy), the 'average' group (approximately average on each of the individual differences scales), and the Neurotic/Schizotypy group (low on extraversion, agreeableness, conscientious but high on neuroticism and schizotypy). The temperamentally stable and outgoing group were statistically more likely to have sightings than the 'average' group and almost significantly more than the Neurotic/Schizotypy group. The three groups of people didn't significantly differ in their reporting behavior or their belief in alien visitation, scientific research, and general alien belief. Our data indicates that people who are highly extroverted, agreeable, open, and conscientious yet emotionally calm and perceptually grounded are more likely to have sightings. This finding is contrary to the negative stereotype that it is people who are temperamentally primed to negative emotion (neurotic) and vulnerable to perceptual and cognitive abnormalities that have sightings.

The wider implications of the data are that a diverse array of personality types see UAP, but it is the temperamentally calmer, and more open individuals who are more likely to self-report having had a sighting. The stereotyped personality profiles do exist in the data: the anxious skeptic/debunker and the eccentric UAP experiencer, but neither of these are the norm across the UAP experiencer and non-experiencer groups, and personality profiles as a set are not significant predictors of UAP outcomes. The data suggest UAP sightings and beliefs are held by all types of people: average, stable, and Neurotic/Schizotypy profile individuals and group differences seem nonexistent or small. Additionally, personality profiles as a set were not significantly related to UAP outcomes or beliefs, which suggests these sightings, beliefs, and attitudes cannot be reductively explained by personality (e.g., motivated cognition). Overall, on average, most people have a relatively 'average personality profile, and some of those people see UAP. Our data suggests that people who are more prone to negative emotion and perceptual disturbances are not the typical personality profile presentation pertaining to experiencers. Those kinds of people tend not to see UAP. Furthermore, the stigma about this

topic needs to be reduced not just because the refusal to report observations may compromise public and military flight safety, but it should also be dropped because the current data indicates that it is all kinds of people see UAP, and many witnesses have several admirable traits, such as openness, conscientiousness, agreeableness, and extraversion. Our data suggests that self-reported UAP sightings cannot be primarily explained by a particular personality profile. There is not a 'certain kind of person' that sees UAP, it is all walks of life, but it does seem that some kinds of people are more open to recognizing and sharing their experience than others.

Limitations

Despite the meaningful and informative findings of this study, there are several limitations. The data was collected via Twitter (now referred to as X), and it is possible that the kinds of people who are interested in following the topic on social media are already distinctly different from the rest of the population not interested in UAP and not following this topic. This could explain why approximately half the sample had sightings rather than what is expected in the general population of about 7% (Nolsoe, 2021). However, this study was focused on whether or not UAP sightings were predicted by personality rather than comparing those who are open to this topic versus those who are not. Therefore, it could be considered a strength that the participant pool included people who were already interested in the topic but didn't have sightings. The sample did not include people who have no access to a computer/Internet or who were illiterate; therefore, it is unclear if people from extremely low socioeconomic backgrounds display similar trends. But given that the spread of the Big-5 personality structure is consistent across socioeconomic backgrounds, this is unlikely to be a factor of note (Hughes et al., 2021). Both age and education type were collected as categorical variables, and future research should collect age as a continuous variable and education as a total number of years of education as opposed to degree types that may not equate across countries.

There may have also been a self-selection bias at play when using a sample from Twitter/X. It could be that when people higher in extroversion, conscientiousness, and openness have a sighting of a UAP, they then join online social media groups because they are conscientious and open nature, whereas people low in conscientiousness and openness might have sightings and not join any groups. It could also be that people high in neuroticism are more likely to be indoors and, therefore, less likely to see objects in the sky. If a much larger sample had been

obtained, then it would have been possible to control and match demographic characteristics and see if differences in personality profiles emerged that were a function of demographics. However, control matching is not ideal, and future research should consider using socially and geographically stratified participant populations to get a fully representative sample to rule out selection bias and expand the array of possible analyses that can be conducted.

It may have been better to use the NEO (Costa & McCrae, 1992) rather than the Big-5 measure (John et al., 1991), and if this study is replicated, that should be considered. The schizotypy measure used (Davidson et al., 2016) is better suited to those who might score on an abnormal level of personality pathology. Therefore, it could be argued that the O-Life (Mason et al., 1995) might have been a better measure for use in the general population. Gullibility and suggestibility were not measured in this study and could be considered in future research to see how much these characteristics and tendencies predict sightings of UAP above and beyond personality variables. A bigger cohort of participants would have been preferred, and under such circumstances, it is likely that the difference between the 'Average' and the Neurotic/Schizotypy groups might have been significant. All other effect sizes were small and suggested that increasing the sample size might not have led to significance. Greater detail and methodological rigor in the collection of UAP accounts will also be advised in the future.

Another limitation of the present study is its potentially low sample size. The sample size is an evolving area of study in the latent class analysis literature, and often the heuristic, as with SEM, is "the more, the better" (Weller et al., 2020). Nylund-Gibson and Choi (2018) recommend 300+ cases but observe that smaller samples may be adequate with simpler models (fewer indicators and classes) and "well-separated classes." The smaller sample size used in the present study is arguably adequate as it meets these criteria: the latent class model was relatively simple with only six indicators, the clusters had well-defined separation and modeled a relatively small number of clusters commonly found using big five data. Also, when the sample size is problematically low, some problems that arise are poor functioning fit indices, convergence failures, and failure to uncover classes with low memberships (Nylund-Gibson & Choi, 2018). The present study had none of these issues in its latent class analyses: fit indices were adequately high, there was model convergence, and the classes had all relatively large memberships (no class had small memberships, e.g., < 5%), all of which reasonably support the sample size's adequacy. That being said, the study results would

be strengthened using a larger sample size and directly replicating the latent cluster results with another, larger sample.

The quality of UAP accounts could have been better assessed for credibility if more information and details were collected about the people and accounts given. However, for the purposes of this study, the descriptions were sufficient and were the most unobtrusive option for participants. It is entirely possible that the 103 participants with UAP sightings could be explained by any combination of the following: false memories, misperception of the event, lies, taking another's story as their own, perceiving the event in the context of substance abuse, embellished their accounts or any other of the numerous potential reasons for falsely describing what they did. The status quo position across the majority of the scientific community is that their descriptions must be intentionally or unintentionally false accounts of what occurred. The null hypothesis is that UAP cannot be due to anything other than a terrestrial explanation, such as advanced human technology or a misunderstanding due to their personal psychology at the time of the observation or something miss misremembered after the original prosaic event.

The authors of this study cannot assert that all or any of the participant's accounts are verifiably true events. Therefore, we cannot confidently state that any of our participants actually saw a 'real' UAP that was not made by human hands. But in light of the recent credible congressional testimony under oath (Committee on Oversight and Accountability, 2023), the seriousness in which the topic is now being openly taken at the highest levels of U.S. government, and the sheer volumes of new and historical sightings coming to light, it might be time for the scientific community to give the majority of UAP experiencers the benefit of the doubt and examine this issue as though the alternative hypothesis could be true. That stance does not negate the vital need for more research capable of explaining UAP encounters as terrestrial prosaically explainable ones, but assuming that the null hypothesis is a fact may stymie scientific exploration and prevent people who have truly anomalous experiences from coming forth to be studied in good faith by the scientific community. Hence, the lack of screening for UAP witness credibility and validity in this sample is a limitation, but the collection of the data was done in good faith with the participants, and it has become reasonable to consider that the alternative hypothesis could be true and that these witnesses may have actually seen something fundamentally anomalous worthy of study.

Implications

The primary implication of the data is that we need to reduce the stigma about seeing and reporting on UAP because all kinds of people see UAP, including very emotionally stable, outgoing, and conscientious people. High openness and extraversion traits might increase the chances of someone thinking that they have seen a UAP, but such traits account for a small amount of the variance in the data and don't explain most UAP sightings. Most cases (86%) do not get reported and logged in any UAP database, which means that it is difficult for the scientific community to understand the extent of the UAP issue.

Standardized public reporting mechanisms also need to be developed by an educated panel that can agree on what data/details need to be collected when there are allegations of a UAP sighting. Most reporting centers collect slightly different information, which can make it hard to collate and compare data sets. The National UFO Reporting Centre receives approximately 3,500-7,000 reports a year, giving an average of about 5000 (Dolan, 2022). Although that sample is primarily based in America, if only 14% of UAP sightings are ever reported, then that must mean there are approximately 35,000 sightings a year in the areas for which they receive data. Even if one assumes that half of the sightings are objectively false for numerous potential reasons, then that still leaves 17,500 sightings a year, which does not include all the other potential locations that may also have sightings.

Witnessing a UAP might be rare statistically given the comparative size of the global population but the frequency of sightings is still substantial enough that collectively they are difficult to ignore and potentially represent a body of data worthy of further investigation. Answers to the biggest questions for humanity cannot be answered by any one single anecdote or even a collection of them. However, with that many anecdotes, a hypothesis begins to form that needs testing. Are we alone, or are we not? It is about time that scientists of all disciplines and public inquiry develop a tangible understanding of this issue. But if the null hypothesis is true, that we are alone for now, then that seems like an equally difficult proposition to prove given the frequency of allegations by credible witnesses at congressional hearings, the sheer volume of sightings that occur, and the 'averageness' of the people observing them.

CONCLUSION

People who report witnessing a UAP are not, on average, much characteristically different from those who have not seen a UAP. There is, however, a greater chance that people who admit to having seen UAP will be extraverted, conscientious, open, and agreeable but low on

neuroticism and vulnerability to abnormal perception. Most UAP sightings are not reported, and therefore, there is an information gap regarding the true extent and diversity of these experiences. The general public reports seeing UAPs that are very similar to what military and service personnel report. The UAP issue represents a very current and perplexing scientific mystery that is worthy of further exploration, and the psychological sciences should take a leading role in unraveling this topic.

ENDNOTES

- 1 "Other" was a category for types of education that did not fit into the college/diploma category, such as a guild or apprenticeship.
- 2 Fourteen sightings were reported to the UFO/UAP organization out of the 103 witnesses. These groups report on the total number of sightings. Thus, this figure has more relevance for interpreting the wider yearly statistics presented by groups such as MUFON and NUFORC rather than using the total sample size of places people reported to.
- 3 The following are United States equivalent years of education: GCSE= 10th Grade, A-Level= 12th Grade, Bachelor's degree= 3 years of additional education (15 years total), Masters Degree= 1 year of additional education (16 years total), Doctoral level = 3-5 years of additional education (19-21 years total), Collage/ diploma= 13-15 years total.

REFERENCES

- Ahmadi, M., Moradi, A. R., Esmaeili, A. T., Mirabolfathi, V., & Jobson, L. (2019). A preliminary study investigating time perception in adolescents with posttraumatic stress disorder and major depressive disorder. *Psychological Trauma, 11*(6), 671-676. <https://doi.org/10.1037/tra0000471>
- Alessandri, G., Vecchione, M., Donnellan, B. M., Eisenberg, N., Caprara, G. V., & Cicciuch, J. (2014). On the cross-cultural replicability of the resilient, undercontrolled, and overcontrolled personality types. *Journal of Personality, 82*(4), 340-353. <https://doi.org/10.1111/jopy.12065>
- Allison, P. D. (2014, March). Measures of fit for logistic regression. In *Proceedings of the SAS Global Forum 2014 Conference* (pp. 1-13). SAS Institute Inc.
- Asan, A. E., & Pincus, A. L. (2023). Examining schizotypal personality scales within and across interpersonal circumplex surfaces. *Assessment, 30*, (7) 2296-2317. <https://doi.org/10.1177/10731911221143354>
- Asparouhov, T., & Muthén, B. (2021). Auxiliary variables in mixture modeling: Using the BCH method in Mplus

- to estimate a distal outcome model and an arbitrary secondary model. *Mplus Web Notes*, 21(11), 1-80.
- Clancy, S. A. (2005). *Abducted: How people come to believe they were kidnapped by aliens*. Harvard University Press. <https://doi.org/10.4159/9780674029576>
- Committee on Oversight and Accountability. (July 26, 2023). Subcommittee on National Security, the Border, and Foreign Affairs Hearing. GOP Oversight [Video] YouTube. <https://www.youtube.com/watch?v=KQ7Dw-739VY&list=PLKtwW3acb-qCzZ5cWKRdZHppqwhjcSfI3F&index=101&t=1415s>
- Compass Prose Legal Group (May 25, 2023). ODN: Intelligence Community Inspector General. Disclosure of Urgent Concern(s) Complain of Reprisal: In Re: David C. Grush GS-15 Civilian, NGA. Compass Rose Legal Group, PLLC.
- Connors, M. H. (2015). Hypnosis and belief: A review of hypnotic delusions. *Consciousness and Cognition*, 36, 27-43. <https://doi.org/10.1016/j.concog.2015.05.015>
- NOT CITED** Cooper, H., Blumenthal, R., & Kean, L. (2017a, December 16). Glowing auras and 'black money': The Pentagon's mysterious U.F.O program. *The New York Times*. <https://www.nytimes.com/2017/12/16/us/politics/pentagon-program-ufo-harry-reid.html>
- Cooper, H., Kean, L., & Blumenthal, R. (2017b, December 16). 2 Navy Airmen and an object that 'accelerated like nothing I've ever seen'. *The New York Times*. <https://www.nytimes.com/2017/12/16/us/politics/unidentified-flying-object-navy.html>
- Costa, P. T., & McCrae, R. R. (1992). *Neo Personality Inventory: Professional manual*. Psychological Assessment Resources.
- Davidson, C. A., Hoffman, L., & Spaulding, W. D. (2016). Schizotypal personality questionnaire – brief revised (updated): An update of norms, factor structure, and item content in a large non-clinical young adult sample. *Psychiatry Research-Neuroimaging*, 238, 345-355. <https://doi.org/10.1016/j.psychres.2016.01.053>
- CITED AS DOLAN** Doland, R. (September 14, 2022). How many UFO's are there really? Richard Doland Intelligent Disclosure [Video]. YouTube. <https://www.youtube.com/watch?v=oKSpUjGzcNQ&t=2453s>
- Espinoza, J. A., Daljeet, K. N., & Meyer, J. P. (2020). Establishing the structure and replicability of personality profiles using the HEXACO-PI-R. *Nature Human Behaviour*, 4(7), 713-724. doi:10.1038/s41562-020-0853-6
- Geiser, C. (2013). *Data analysis with Mplus*. Guilford Press.
- House Intelligence. (2022, May 17). Open c3 subcommittee hearing on unidentified aerial phenomena [Video]. YouTube. <https://www.youtube.com/watch?v=aS-DweUbGBow&list=PLKtwW3acbqCzZ5cWKRdZHppqwhjcSfI3F&index=77&t=4863s>
- Hughes, B. T., Costello, C. K., Pearman, J., Razavi, P., Bedford-Peterson, C., Ludwig, R. M., Srivastava, S. (2021). The big five across socioeconomic status: Measurement invariance, relationships, and age trends. *Collabra: Psychology*, 7(1), Article p24431. <https://doi.org/10.1525/collabra.24431>
- JASP Team. (2023). JASP (V. 0.17.3) [Computer software].
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). Big Five Inventory [Dataset]. In *PsycTESTS Dataset*. <https://doi.org/10.1037/t07550-000>
- Kang, Hur, N., Lee, S., & Yoshikawa, H. (2008). Horizontal parallax distortion in toed-in camera with wide-angle lens for mobile device. *Optics Communications*, 281(6), 1430-1437. <https://doi.org/10.1016/j.optcom.2007.11.016>
- Kappes, A., Harvey, A. H., Lohrenz, T., Montague, P. R., & Sharot, T. (2020). Confirmation bias in the utilization of others' opinion strength. *Nature Neuroscience*, 23(1), 130-137. <https://doi.org/10.1038/s41593-019-0549-2>
- Kean, L., & Blumenthal, R. (2023). Intelligence official says U.S. has retrieved craft of non-human origin. Debrief Media. <https://thedebrief.org/intelligence-officials-say-u-s-has-retrieved-non-human-craft/>
- Lange, R., & Thalbourne, M. A. (2002). Rasch scaling paranormal belief and experience. Structure and semantics of Thalbourne's Australian Sheep-Goat Scale. *Psychological Reports*, 91, 1065-1073. <https://doi.org/10.2466/pr0.2002.91.3f.1065>
- Lieberman, A. M. (2005). How much more likely? The implications of odds ratios for probabilities. *American Journal of Evaluation*, 26(2), 253-266. <https://doi.org/10.1177/1098214005275825>
- Loftus, E. F. (2003). Make-believe memories. *American Psychologist*, 58, 867-873. <https://doi.org/10.1037/0003-066X.58.11.867>
- Mason, O., Claridge, G., & Jackson, M. (1995). New scales for the assessment of schizotypy. *Personality and Individual Differences*, 18, 7-13. [https://doi.org/10.1016/0191-8869\(94\)00132-C](https://doi.org/10.1016/0191-8869(94)00132-C)
- McGaugh, J. L. (2003). *Memory and emotions: The making of lasting memories*. Columbia University Press.
- McNally, R. J., & Clancy, S. A. (2005). Sleep paralysis, sexual abuse, and space alien abduction. *Transcultural Psychiatry*, 42(1), 113-122. <https://doi.org/10.1111/j.0956-7976.2004.00707.x>
- McNally, R. J., Lasko, N. B., Clancy, S. A., Macklin, M. L., Pitman, R. K., & Orr, S. P. (2004). Psychophysiological responding during script-driven imagery in people reporting abduction by space aliens. *Psychological*

- Science*, 15(7), 493–497
- Menard, S. (2001). *Applied logistic analysis, Quantitative applications in the social sciences series #106*. Sage Publications.
- Moskowitz, Dorahy, M. J., & Schäfer, I. (2019). *Psychosis, Trauma and Dissociation: Evolving perspectives on severe psychopathology*. John Wiley & Sons, Incorporated. <https://doi.org/10.1002/9781118585948>
- Muthén, B. O. (2008). What is a good value of entropy? <http://www.statmodel.com/discussion/messages/13/2562.html?1487458497>
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus user's guide* (8th ed.). Author.
- NASA Video. (2023, May 31). Public Meeting on Unidentified Anomalous Phenomena. [Video] YouTube. <https://www.youtube.com/watch?v=bQo08JRY-OiM&list=PLKtwW3acb-qCzZ5cWKRdZHpqwhjcS-fl3F&index=96&t=12557s>
- Nolsoe, E. (2021). Half of Britons think aliens exist – and 7% claim to have seen an UFO. YouGov. <https://yougov.co.uk/topics/politics/articles-reports/2021/06/25/half-britons-think-aliens-exist-and-7-claim-have-s>
- Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science*, 4(4), 440-461. <https://doi.org/10.1037/tps0000176>
- Office of the Director of National Intelligence. (2021, July 25). Preliminary Assessment: Unidentified Aerial Phenomena. <https://www.dni.gov/files/ODNI/documents/assessments/Prelimar-Assessment-UAP-20210625.pdf>
- Office of the Director of National Intelligence. (2022, January 12). 2022 Annual Report on Unidentified Aerial Phenomena. <https://www.dni.gov/files/ODNI/documents/assessments/Unclassified-2022-Annual-Report-UAP.pdf>
- Preece, P., & Baxter, J. H. (2000). Scepticism and gullibility: the superstitious and pseudo-scientific beliefs of secondary school students. *International Journal of Science Education*, 22(11), 1147–1156. <https://doi.org/10.1080/09500690050166724>
- Qualtrics. (2023). Provo, Utah, USA, used March 2023. <https://www.qualtrics.com>
- Robertson, D. J. (2013). *The Practice of Cognitive-Behavioural Hypnotherapy: A manual for evidence-based clinical hypnosis* (1st ed.). Routledge. <https://doi.org/10.4324/9780429482793>
- Robin, F., Bonamy, J., & Ménétrier, E. (2018). Hypnosis and false memories. *Psychology of Consciousness*, 5(4), 358–373. <https://doi.org/10.1037/cns0000150>
- Sharpless, B., & Doghramji, K. (2015). Diagnostic criteria, diagnostic issues, and possible subtypes of sleep paralysis. In *Sleep paralysis*. EDITORS (pp. 147-152) Oxford University Press. <https://doi.org/10.1093/med/9780199313808.003.0011>
- Specht, J., Luhmann, M., & Geiser, C. (2014). On the consistency of personality types across adulthood: latent profile analyses in two large-scale panel studies. *Journal of Personality and Social Psychology*, 107(3), 540-556. <https://doi.org/10.1037/a0036863>
- Stubbings, D. R. (March 16, 2023). [Twitter] https://twitter.com/Dr_Stubbings/status/1636246918375374848?s=20
- Swami, V., Furnham, A., Haubner, T., Stieger, S., & Voracek, M. (2009). The truth is out there: The structure of beliefs about extraterrestrial life among Austrian and British respondents. *Journal of Social Psychology*, 149(1), 29–43. <https://doi.org/10.3200/SOCP.149.1.29-43>
- Swami, V., Pietschnig, J., Stieger, S., & Voracek, M. (2011). Alien psychology: Associations between extraterrestrial beliefs and paranormal ideation, superstitious beliefs, schizotypy, and the Big Five personality factors. *Applied Cognitive Psychology*, 25(4), 647-653. <https://doi.org/10.1002/acp.1736>
- Unidentified Anomalous Phenomena Disclosure Act of 2023, U.S.C. § 2226 (2023)
- U.S. Senate Committee Armed Services. (April 19, 2023). Subcommittee on emerging threats and capabilities. Open/closed: To receive testimony on the mission, activities, oversight, and budget of the all-domain anomaly resolution office. Open/Closed: To receive testimony on the... | U.S. Senate Committee on Armed Services
- Weller, B. E., Bowen, N. K., & Faubert, S. J. (2020). Latent class analysis: A guide to best practice. *Journal of Black Psychology*, 46(4), 287-311. <https://doi.org/10.1177/0095798420930932>
- Wiseman, R., & Watt, C. (2004). Measuring superstitious belief: Why lucky charms matter. *Personality and Individual Differences*, 37(8), 1533-1541. <https://doi.org/10.1016/j.paid.2004.02.009>
- Worrell F. C., & Cross W. E., Jr. (2004). The reliability and validity of Big Five Inventory scores with African American college students. *Journal of Multicultural Counseling and Development*, 32(1), 18–32. doi: 10.1002/j.2161-1912.2004.tb00358.x.