Q1. Analyze the mint and secondary NFT marketplace activity for Nouns DAO. Can we conclude if there are certain types of traits (body, accessory, etc.) that are causing some Nouns to sell or mint for more than others?

Ans1.

Analysis of Mint Data:

Nouns are made up of the following traits, 2 backgrounds, 30 bodies, 137 accessories, 234 heads, and 21 glasses. Every 24 hours a new Noun is created and auctioned by the Nouns Auction Contract. Till now a total of 338 Noun are created from Noun 0 to Noun 337.

For present analysis, let us consider Background, Bodies, Accessories, Heads, and Glasses as the Box with each box has different balls in it. So, we can say that the Background box has 2 balls, the Bodies box has 30 balls, the Accessories box has 137 balls, the Heads box has 234 balls and the Glasses box has 21 balls. Each ball has a different number written on it starting from 0.

So,

Probability of selection of ball/trait from Background box for 338 Nouns $= \frac{1}{2} \times 338 = 169$

Probability of selection of ball/trait from Bodies box for 338 Nouns $= \frac{1}{30} \times 338 = 11.267$

Probability of selection of ball/trait from Accessories box for 338 Nouns $= \frac{1}{137} \times 338 = 2.467$

Probability of selection of ball/trait from Heads box for 338 Nouns $= \frac{1}{234} \times 338 = 1.444$

Probability of selection of ball/trait from Glasses box for 338 Nouns $= \frac{1}{21} \times 338 = 16.095$

From the above analysis, it can be observed that the frequency of occurring one type of ball/trait (maximum Nouns with the same type/trait out of 338 Nouns) from the Background box for 338 Nouns is 169. Similarly for Bodies box is 11.267, for Accessories box is 2.467, for Heads box is 1.444 and for Glasses box is 16.095. Table 1 illustrates this.

Table 1: Maximum Nouns with the same type/trait

Trait (types)	Maximum Nouns with the same type/trait (Out of 338 Nouns)
Backgrounds (2)	169
Bodies (30)	11.267
Accessories (137)	2.467
Heads (234)	1.444

Glasses (21)	16.095

Figure 1 shows the most frequent trait types that appeared in these 338 Nouns. This data is captured with the help of Flipside's Ethereum_core schema. So from figure 1, we can say that for a total of 338 Noun mints, trait/ball ***warm*** from the Background box is picked 173 times, trait/ball ***Grayscale-8*** from Bodies box is picked 21 times, trait/ball ***Checker-RGB*** from Accessories box is picked 7 times, trait/ball ***Chipboard*** from Heads box is picked 4 times ad trait/ball ***Square-yellow-orange*** from Glasses box is picked 21 times.

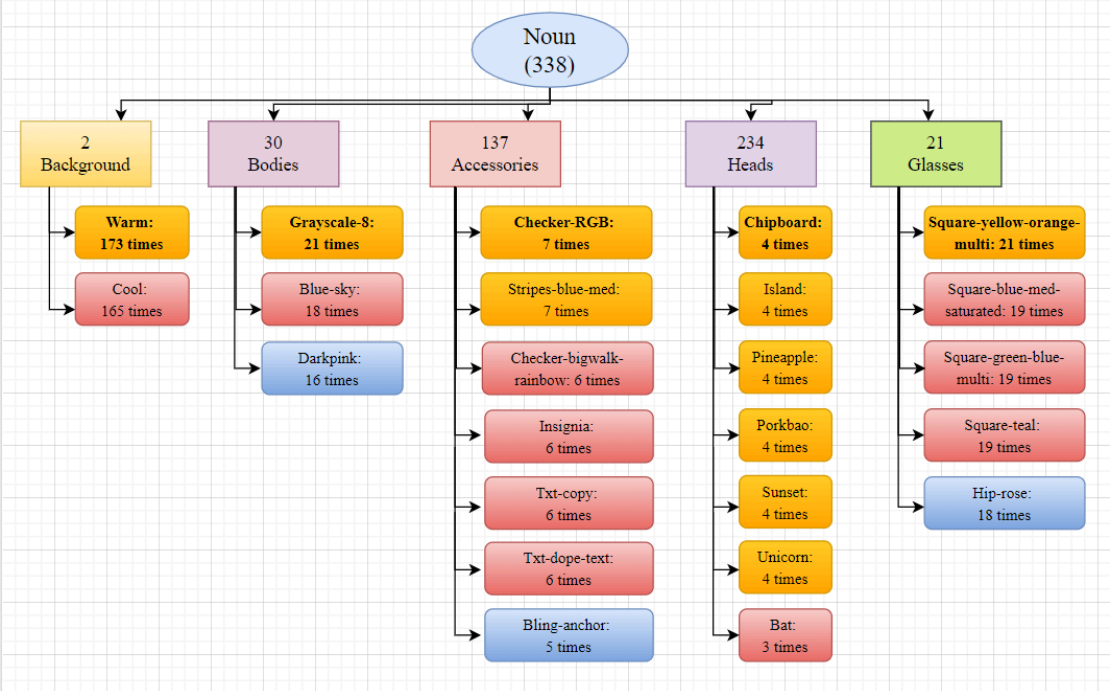

Figure 1: Top 3 most frequent trait/ball types (Trait: maximum occurrences) for each trait type

Table 2 shows the comparison of the probability of the maximum occurrence versus the maximum actual occurrence of the same trait/ball. From table 2 it can be observed that the maximum **actual** occurrence of a trait/ball is **more** compared to what was found using probability analysis. So from this minting data, it can be concluded that for certain types of traits (body, accessory, etc.), more selling and minting is happening compared to other traits.

Table 2: Comparison of Maximum actual occurrence of the same trait vs. result obtained from probability analysis for the same trait (Mint data)

Trait (types)	**Probability of maximum occurrence of same type/trait (Out of 338 Nouns)**	**The maximum actual occurrence of the same trait (In decreeing order)**
Backgrounds (2)	169	173, 165
Bodies (30)	11.267	21, 18, 16

Accessories (137)	2.467	7(Two times), 6(Four times), 5
Heads (234)	1.444	4 (Six times), 3
Glasses (21)	16.095	21, 19 (Three times), 18

Traits never occurred in 338 Nouns

From the minting data, it is observed that some of the traits never occurred in 338 Nouns. A total of 8 ***Accessory*** traits out of 137 traits never occurred and a total of 43 ***Head*** traits out of 234 traits never occurred. Below are ***Accessory*** and ***Head*** traits that never occurred in 338 Nouns.

Accessory: Axe, Bling-arrow, Checkers-big-red-cold, Lightbulb, None, Stripes-red-cold, Txt-ico, and Wet-money.

Head: Aardvark, Bag, Banana, Basketball, Beet, Boombox, Box, Brain, Bubblegum, Car, Chain, Chefhat, Cherry, Chilli, Chips, Chocolate, Cottonball, Crane, Doughnut, Drill, Factory-dark, Flower, Goldcoin, Heart, Helicopter, Igloo, Lips, Microwave, Mosquito, Mustard, Orangutan, Paperclip, Peanut, Piano, Rgb, Ring, Sailboat, Sandwich, Smile, Spaghetti, Thumbsup, Tooth, and Wallsafe.

This indicates that the appearance of some traits in the model results in not minting/selling of those particular models.

Analysis of Secondary Marketplace:

To analyze the secondary marketplace, data from opensea.io is utilized. Out of 338 Nouns, a total of 63 Nouns are listed with a price. The Nouns with the maximum price of 200ETH are Noun 25 and Noun 40.

Table 3 shows the comparison of the probability of the maximum occurrence versus the maximum actual occurrence of the same trait/ball out of the 63 Nouns listed on the opeansea.io platform. From table 3 it can be observed that the maximum **actual** occurrence of a trait/ball is **more** compared to what was found using probability analysis. The secondary marketplace also includes various other factors like emotions or attachment with Noun, and type of investment (short term/long term), which cannot be calculated using a formula as they vary with each individual. If we ignore these factors and analyze the data, it can be concluded that Nouns with certain types of traits (body, accessory, etc.), are listed at a higher price compared to other Nouns.

Table 3: Comparison of Maximum actual occurrence of the same trait vs. result obtained from probability analysis for the same trait (Nouns listed on opensea.io)

Trait (types)	**Probability of maximum occurrence of same type/trait (Out of 63 Nouns)**	**The maximum actual occurrence of the same trait (In decreeing order)**
Backgrounds (2)	31.5	36, 27
Bodies (30)	2.1	6, 6, 4
Accessories (137)	0.459	3, 2(6 times), 1

Heads (234)	0.269	3 (2 times), 2
Glasses (21)	3	8, 7, 6

Conclusion

From the above two analyses, we can say that, yes minting/selling/listing of Nouns with certain traits are higher compared to others, as some of the traits never occurred in 338 Nouns. So from this analysis, we can say that there is no single favorite trait type that results in higher minting/selling/listing, but a combination of certain traits together has higher chances of selling/minting/listing more compared to other traits.

- The ***warm*** trait from the background is common for both Nouns listed in the marketplace and the number of minting Nouns.
- The ***Grayscale-8*** trait from Bodies is common for both Nouns listed in the marketplace and the number of minting Nouns.
- The top 5 Nouns listed on the opensea.io marketplace have ***warm*** background trait
- The most common type of bodies trait is ***Grayscale-8***

Q2. Who is typically settling Nouns auctions? Does the winner settle the auction, or does an eager new bidder settle the current auction to begin the next auction?

Ans2.

It is most likely settled by the winning bidder of the previous auction, but an eager bidder with a valid Ethereum address can also set it, to trustlessly allow the system to auction.