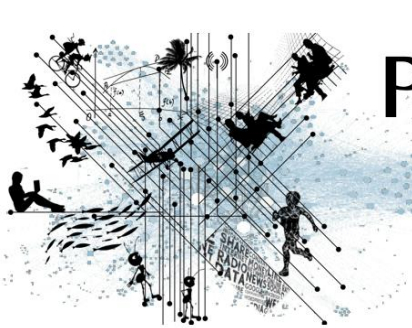




Peer Community In Network Science

A social network of bucks

Gabriel Ramos-Fernández based on reviews by Brenda McCowan and Sandra Smith Aguilar

A recommendation of:

Long term analysis of social structure: evidence of age-based consistent associations in male Alpine ibex

Alice Brambilla, Achaz von Hardenberg, Claudia Canedoli, Francesca Brivio, Cedric Sueur, Christina Stanely (2022), *bioRxiv*, 2021.12.02.470954, ver. 3 peer-reviewed and recommended by Peer Community in Network Science

<https://doi.org/10.1101/2021.12.02.470954>

Data used for results

<https://doi.org/10.5061/dryad.w0vt4b8st>

Scripts used to obtain or analyze results

<https://doi.org/10.5061/dryad.w0vt4b8st>

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Recommendation

How do social networks change over the long term? What features are more stable? Are there individuals that maintain their position? What factors determine this? These are the questions that Brambilla et al. (2022) successfully address in their manuscript, for a network of male Alpine ibex (*Capra ibex*) in the northwestern Italian Alps.

While it is widely acknowledged that animal social networks are dynamic (Pinter-Wollman et al. 2014) not often can we see analyses of this temporal variation using data sets collected on the same individuals for long periods of time. Brambilla et al. (2022) collected such a data set on individually identified bucks from a wild-ranging population for ten years. Alpine ibex populations are sexually segregated except for the rutting period, which justifies focusing a social network analysis on each of the sexes separately. They also present a low degree of fission-fusion dynamics, forming cohesive groups or spreading over larger areas depending, presumably, on the resource heterogeneity. Taking advantage of the fact that temporary subgroups can be observed, Brambilla et al. (2022) measured the degree of association between individual bucks by the time they spent in the same subgroup. Building yearly networks with links thus defined, the authors were able to analyze the changes and stability of networks across the years.

In all yearly networks, all bucks are connected in a single, giant component, which implies either that subgroups were sufficiently fluid in composition to include all possible pairs of individuals at least once, or that bucks formed temporarily large subgroups that included all of them, at least sometimes. This connectedness of the networks, as well as their high link density, prevailed over the whole study and can be said to characterize buck social networks. Other features, like the degree of centralization, differed between summer and spring networks, but in a consistent fashion across years, suggesting that the degree of resource heterogeneity (which is higher in the spring, when the snow melts only at low altitude) influences the association patterns between bucks.

When analyzing the social network metrics at the node level, Brambilla et al. (2022) found a very clear effect of age, with individual degree and eigenvector centrality increasing and then decreasing as bucks aged. In fact, bucks showed mostly peripheral positions in the network of the year before their death. These results add to the accumulating evidence that age and social position are intricately linked (Sueur et al. 2021). The yearly networks also showed strong homophily by age, with bucks of similar age showing stronger bonds than those of different age, and an opposite effect of dominance rank, with bucks of similar rank showing weaker bonds than those of dissimilar rank.

In addition to the obvious integration of these results to those of the female social networks, including the rutting period, it remains to be studied what mechanisms at the individual and behavioral levels could lie behind these patterns: are individuals of similar age also similar in their nutritional requirements? Are they more familiar with each other because of spending time together since young? Are older individuals unable to invest in maintaining social relationships and therefore displaced from more central positions in the network? Are similarly ranked individuals more likely to enter into conflict and therefore avoid one another? Does personality influence patterns, beyond dominance rank or age?

These are open questions that result from a solid study, which counts as its strengths the longitudinal data set, rigorous methods for analyzing networks at the global and node levels and for statistically testing differences and similarities between networks at different points in time and a nicely written literature review with a broad taxonomic scope.

References

Brambilla A, Hardenberg A von, Canedoli C, Brivio F, Sueur C, Stanley CR (2022) Long term analysis of social structure: evidence of age-based consistent associations in male Alpine ibex. bioRxiv, 2021.12.02.470954, ver. 3 peer-reviewed and recommended by Peer Community in Network Science. <https://doi.org/10.1101/2021.12.02.470954>

Pinter-Wollman N, Hobson EA, Smith JE, Edelman AJ, Shizuka D, de Silva S, Waters JS, Prager SD, Sasaki T, Wittemyer G, Fewell J, McDonald DB (2014) The dynamics of animal social networks: analytical, conceptual, and theoretical advances. Behavioral Ecology, 25, 242–255. <https://doi.org/10.1093/beheco/art047>

Sueur C, Quque M, Naud A, Bergouignan A, Criscuolo F (2021) Social capital: an independent dimension of healthy ageing. HAL, hal-03299528, ver. 3 peer-reviewed and recommended by Peer Community in Network Science. <https://hal.archives-ouvertes.fr/hal-03299528>

Reviews

Toggle reviews

Evaluation round #1

DOI or URL of the preprint: <https://doi.org/10.1101/2021.12.02.470954>

Version of the preprint: 1

Author's Reply, 20 Feb 2022

[Download author's reply](#)[Download tracked changes file](#)

Dear Gabriel Ramos-Fernández,

Thank you very much for considering our manuscript and for allowing us to revise it. We have edited the text following the helpful suggestions of the reviewers. Most of the changes were related to the structure of the discussion but we also have added some details on the methods. In addition, we have included one more co-author to recognize her contribution in terms of data provision, which was not previously recognized.

Please, find the replies to the reviewers in italics below each comment in the attached document. We have uploaded the revised manuscript on biorXive and, for your use, we also upload here the new version with track changes (line number indicated in the replies refers to the manuscript with track changes).

As in the previous version, data and scripts for revision use can be found here https://datadryad.org/stash/share/ribkWEC_BGfiJL5dYxSZq5Yq5Ju7hWmNKEtAPZFjySQ and will be publicly available at the end of the review process.

We hope that the new version may be considered worthy of recommendation on PCI Network Science and, waiting to hear back from you, we send you our best regards.

Alice Brambilla on behalf of the authors

Decision by [Gabriel Ramos-Fernández](#), 20 Feb 2022

The two reviewers have found your paper interesting and clearly written. Please follow their recommendations to structure the Discussion section better and to specify details in the methods, particularly in how associations were defined in time.

Reviewed by [Brenda McCowan](#), 31 Jan 2022

[Download the review](#)

Reviewed by [Sandra Smith Aguilar](#), 16 Jan 2022

The paper is aimed at investigating the temporal dynamics of the social network of male alpine ibex using ten years of association data. They specifically looked at the consistency of male associations through time, the relationship between individual attributes and network metrics, the change in the social network structure associated to different ecological factors and the relationship between structural characteristics and demographic factors.

The study is presented in a clear and clean manuscript, making it easy and enjoyable to read. Authors clearly paid careful attention to structure. The introduction presents appropriate background information to understand the problem, clearly stating objectives and predictions with a corresponding methods section which allows the reader to understand how the objectives were addressed. The results were presented in a way which corresponded to the methods, highlighting those which were relevant for the study question with appropriate tables and figures to accompany the text. Then, the relevant findings were integrated into an appropriate discussion which drew from knowledge on the study species and others, to highlight the contributions of the study for the understanding of Alpine ibex sociality. Overall I think it is a very good study which not only contributes with aspects of Alpine ibex sociality, but also has merit for its methodological approach.

I just have some very minor comments and suggestions for the authors:

L94. Suggested edit: "...As recent studies on personality (...) have shown..."

L128-129. Please check and correct the sentence

L193. Edit “migration” to “migrations”

L217-219. And did you record any

L224-227. So you defined an association if two individuals were seen in the same group during one day, independently of how many times they were observed per day?

L459. Edit “determinations” to “determination” and correct in other instances further on.

L521-522. It would be interesting to expand on this. Why wouldn’t we expect individual differences in centrality given the other results? Or does it mean that certain individuals, have particularly high/low centralities regardless of their age? What other attributes could be relevant in this respect? Personality?

L534. Edit “connection” to “connections”

L541. Edit: “snow energetically demanding” to “snow is energetically demanding”

L546: Maybe change “competitions” for “contests”?

L577-578. If resources were distributed more heterogeneously, wouldn’t we expect lower home range overlap due to individuals spreading around to different food patches?

L622-623. Do you think you would find anything interesting if looking at the relationship between the average rank of associates and changes in rank from one season to the next?

L684. Could you provide us with an approximate home range size?

L695-697. In this regard, what do you think was the effect of using a seasonal scale to build the networks? Do you think it would be worth looking at a finer temporal scale in future studies to explore details of the social dynamics?

L708. Change “association” for “associations”