# Detecting Hybrid Social Identities:

## A Computational Analysis of Influence & Resilience in Online (RWE) Communities

**FULL REPORT**

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# Detecting Hybrid Social Identities:
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# 1. EXECUTIVE SUMMARY

Hybrid identities, defined as the fusion of two group memberships and their belief systems, have become an increasing feature of online communities, including right-wing extremist online communities. A hybrid identity may allow those that hold it to gain acceptance in each of the two communities that make up the hybrid identity, thereby providing a platform for social influence where beliefs of one community can be introduced to the other community. For example, the hybrid aspects of an eco-fascist identity might be used by right-wing community members to shift the balance from more mainstream ecological opinions towards more extreme right-wing positions. This kind of influence necessitates a better understanding of the psychosocial processes that drive the social influence of hybrid identities.

The present research aimed to investigate whether and how hybrid identities can be used by online communities to extend their reach into other online communities. To do so, we used the eco-fascist identity as a case study. The eco-fascist community is a prominent group with a hybrid identity (Thomas & Gosink, 2021). Given that eco-fascist ideas have been used to justify recent terrorist attacks, such as the Christchurch attack in 2019 and Buffalo supermarket attack in 2022 (Farrell-Molloy & Macklin, 2022), and ecological movements are growing substantially in response to the climate emergency, eco-fascism has been suggested as the most imminent threat of hybrid communities (Macklin, 2022).

To assess the influence dynamics of this kind of hybrid identity, we explored the way individuals wrote posts in publicly available online forums that bridged the eco-fascist divide. These included two ecology forums, two far-right forums, and three forums that were identified to include eco-fascist contents. Specifically, we examined three major mechanisms of influence:

- the hybrid identity, which could utilise shared aspects of a moderate identity to build a bridge to a radical identity;

- the topics that could frame scientific evidence or suggest interventions that are aligned with far-right ideological positions (e.g., anti-immigration);

- how norms are coordinated through language to influence the acceptability of views and behaviours.

To do so, we applied an automated natural language analysis and combined it with qualitative analysis. These methods were theoretically informed by key principles of the Social Identity Approach (SIA, Spears, 2021). SIA suggests that influence operates in a group based on appeals to people's shared group membership. When a shared group membership becomes situationally relevant (salient), group members' behaviour tends to align with the group's norms (Reicher et al., 2010). This theoretical basis allowed us to study i) the influence mechanisms of hybrid identities, and ii) how they can serve resilience in online settings.

By combining natural language processing techniques and machine learning techniques with social psychological theory:

- We trained and validated an automated social identity assessment (ASIA) tool (Koschate et al., 2021) that detects which identity (e.g., eco or fascist) is situationally salient based on writing style, and then we examined the active use of the hybrid identity to gain influence in online communities (Study 1).

- We identified the topics of influence that online ecological movements tend to dive into and are likely to be used by the hybrid community to

spread their ideology (Study 2).

- We examined how norms are constructed and coordinated through language within these communities to mobilise actions (Study 3).

Our main findings can be summarised as:

- The theory-informed natural language processing techniques employed in this project showed a good ability to distinguish eco-, far right and hybrid eco-fascist identities.

- Our topic analysis techniques were able to identify coherent narratives linked to change that have been framed in line with far right ideological positions.

- Our exploratory techniques on norms showed similarities and differences in the way that norms are constructed and coordinated between eco and hybrid communities. Limitations included sample representativeness. As data were collected from different forums of the same online platform our sample may be biased in ways consistent with its user base. Models can be improved by testing data from different online platforms and by employing methods to control for contextual, demographic and other individual differences.

- Hybrid eco-fascist identities included stylistic features of both far right and eco identities. Depending on the social context (e.g., the topic of a forum thread), individuals with a hybrid identity can activate that part of their hybrid identity (eco or fascist) that is most relevant. This adaptive capacity of the hybrid eco-fascist identity means that it is likely to be a resilient identity (e.g., Farrell-Molloy & Macklin, 2022) and thus difficult to challenge.

- In exploring topics of influence within the hybrid and eco forums, our analysis found that environmental dilemmas or threats constitute a major topic of discussion for both communities, albeit different in the ways these dilemmas are approached. In social psychological terms,

these kinds of threats are likely to drive adaptive behavioural change (Goodwin et al., 2005). Discussions about the threats of human actions on endangered species, existential threats associated with the use of nuclear power, and overpopulation are likely to open up new opportunities to hybrid eco-fascist groups to introduce their ideas in eco movements. The principal mechanism of influence seems to be sharing links of relevant contents (eco and far right) to justify their positions.

- On the other hand, our analysis suggested that eco communities might be calling out these attempts as shown by labelling certain ideas or people as fascist or nazi. Thus, the analysis provided some preliminary evidence for potential resistance to hybrid influence.

- In terms of norm construction and use, we investigated four types of norms: descriptive, injunctive, trending, and moral norms that have been found to influence behaviour. The degree of similarity/conformity in how the eco community constructed descriptive, moral, and trending norms was not statistically different from the degree of conformity in how the hybrid community constructed the same type of norms. However, the eco community showed more conformity in injustice norms compared to the hybrid community.

- Regarding the psychosocial underpinnings of norm construction, the hybrid community showed a consistent pattern of using more power and culture-related linguistic features in their writing style than the eco community when constructing all four types of norms. Given that these linguistic categories encompass political, national, ethnic, racial and anti-technology features (Boyd et al., 2022) that are consistent with eco-fascist narratives, communicating norms using these features can be seen as a way to strengthen the hybrid identity.

We conclude that similarities and differences in norm coordination through language between the eco and the hybrid community and the consistency in the communicative features that the eco-fascist community uses to construct and communicate norms are likely to add into the adaptive capacity of the hybrid identity.

## CONCLUSIONS AND FUTURE DIRECTIONS

This project is a proof of concept for the function of hybrid identities in online settings. We found initial evidence that the adaptive capacity of a hybrid identity can make it hard to be challenged online. This adaptiveness is shown by (i) making a specific identity more salient than the other depending on context demands, (ii) creating coherent narratives linked to change in line with common discussion topics, (iii) consistency in norm coordination through language. Future work needs to combine natural language processing techniques with experimental and qualitative work to further explore the mechanisms and directionality of the potential influence of hybrid identities in online communities. Key questions for future research may include:

1. How can hybrid group members use stylistic features to become accepted rather than being rejected? Can interactions with moderate communities initiate de-radicalisation in hybrid members?

2. Which linguistic strategies are most effective in re-shaping the community and exerting extremist influence?

# 2. AN AUTOMATED ASSESSMENT OF HYBRID IDENTITY

## 2.1 INTRODUCTION

Integral to the investigation of a hybrid identity is the assumption that two (or more) different identities come together to re-shape values, beliefs, and actions. As mentioned, a hybrid identity may allow those that hold it to gain acceptance in each of the two communities that make up the hybrid identity, thereby providing a platform for social influence where beliefs of one community can be introduced to the other community. This requires that those with a hybrid identity can switch seamlessly between the behavioural norms of the two communities in response to the social context. As such, assessing the dynamic nature of identities within eco-fascist communities in a theory-driven way allows us to examine how hybrid identities operate in complex online environments where several identities may compete. The specific aims of the first set of studies were to investigate:

1. Whether the two identities that form a hybrid identity differ in their writing style to such an extent that we can detect which identity is active (salient) within the context.

2. Whether a hybrid social identity is related to the writing style of the two identities it originates from, or whether the writing style reflects a novel identity.

3. The dynamic interplay of these identities as a means of resilience.

## 2.2 METHODOLOGY

We trained an Automated Social Identity Assessment (ASIA) model that allows us to detect the relative salience of one particular identity over another from the linguistic style of a relatively short written text (Koschate et al., 2021). To do so, we followed the step-by-step tutorial for the training and validation of a classifier that distinguishes which of two social identities is salient at the point of writing. This process includes the pre-processing/cleaning of data (e.g., excluding bots, minimal number of words in each comment etc.), the extraction of quantified linguistic features, regression-based model training and validation. For an overview of the ASIA methodology and the tutorial, please visit: https://github.com/Identity-lab/Tutorial-on-salient-social-Identity-detection-model

For the purpose of this study, we trained and tested an ASIA model that distinguishes between the salience of an eco identity and a far-right identity. The online data were collected from two environmental forums, two forums that propagated far-right content and three forums that were identified to include eco-fascist contents. Data were collected from Reddit via the Reddit API and Google BigQuery. All forums were publicly available. Data from these forums were cleaned following the ASIA criteria.

ASIA relies on linguistic features that remain largely agnostic with respect to the topic. To extract these features, text data were imported in the Linguistic Inquiry and Word Count software (LIWC-22, Boyd et al., 2022). LIWC-22 can be used to quantify linguistic features. We extracted 43 linguistic features that were associated with how people write rather than the content of their writing, such as grammatical

features (e.g., number of pronouns). The decision for the type of linguistic features that were included was informed by the social identity approach (e.g., Spears, 2021), the group interaction model (van Swol & Kane, 2019), psychological research on ideological identities and identification markers (e.g., Hughes et al., 2022; Sterling et al., 2020), and sociolinguistics (e.g., Rocci & de Saussure, 2016).

## 2.3  RESULTS

The extracted linguistic features from one eco forum and one far-right forum were used for training. The model was trained on a set of 10,000 comments. The overall performance of the model was estimated through the area under the Receiver Operating Characteristic curve (ROC AUC), which is a measure of how well the model separates between two classes (eco and far-right). Scores closer to 1 represent better separation capacity. The accuracy of the trained model was ROC AUC = 0.78 indicating good separation.

### 2.3.1    WITHIN-PLATFORM VALIDATION

To validate our trained model, we applied it on a second set of one eco and one far-right forum. The model maintained its accuracy, ROC AUC = 0.75. An inspection of the confusion matrix that is depicted in Figure 1 showed that 1087 out of 1500 posts from the forum that included far-right contents were successfully classified to be demonstrating the linguistic features of the far-right identity; and 946 out of 1500 posts from the ecology forum were successfully classified to be demonstrating the linguistic features of the ecology identity.
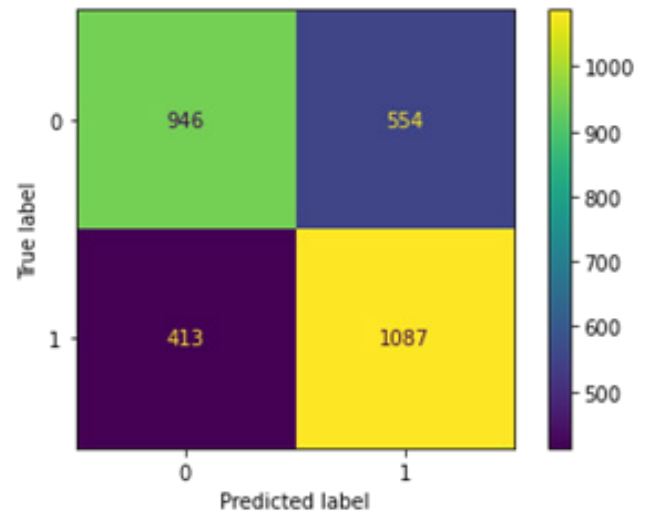


*Figure 1. Confusion Matrix*

### 2.3.2   APPLYING ASIA ON HYBRID FORUMS

To assess whether hybrid forums include linguistic features of both identities, we calculated and compared the average predicted probability of each forum. As the model had been trained to distinguish between a far-right forum (coded as 0) and an eco-identity (coded as 1), higher values represent a higher probability that an eco-identity was salient, whereas lower values indicate that a far-right identity was more likely to be salient.

The average predicted probabilities of the eco forums were 0.61 and 0.56, respectively. The average predicted probabilities of the far-right forums were 0.35 and 0.38. The eco forum is not 1 and the fascist forum is not 0, which reflects the variability of language usage within each forum. Although this means the classifiers are not perfect, there is still adequate separation between the populations. The average predicted probabilities of the three hybrid forums were 0.41, 0.48 and 0.45. The hybrid identities scored between the eco and far-right identities indicating that ASIA identified linguistic features of both identities within the hybrid forums.

### 2.3.3   SWITCHING IDENTITIES

In a follow-up study, we investigated whether users adapt their linguistic features in line with the identity that is associated with specific topic threads (eco or far-right) within the hybrid communities. After a qualitative inspection of the hybrid forums, we identified three eco threads in the hybrid forums consisting of 15 comments and 38 far-right threads consisting of 613 comments. Using our trained ASIA, we calculated the average predicted probability of the far right and eco threads and compared them using a non-parametric test. The results suggested that the hybrid identity users who made these posts tended to switch between identities depending on the type of thread. In other words, the users' writing style was more reflective of the eco-identity in the eco threads and more reflective of the far-right identity in the far-right threads.

## 2.4  CONCLUSION

Hybrid eco-fascist identities include linguistic features of both identities. These identities become salient depending on changes in the context (e.g., via topic). This adaptive capacity of the hybrid identity indicates the reason why an eco-fascist identity has been referred to as a resilient identity (e.g., Farrell-Molloy & Macklin, 2022).

# 3. IDENTIFYING TOPIC-LEVEL INFLUENCES

## 3.1 INTRODUCTION

Eco-fascist groups do not deny climate change (Hughes et al., 2022). Instead, they translate science and actions against global warming through the ideological lenses of the extreme right. This means that ideas and topics that are shared among ecological movements may be used by eco-fascist online communities to spread their ideological positions. Here, we asked:

1. What topics drive influence in online eco communities?

2. How can these topics be used by hybrid eco-fascist groups to spread far-right ideas?

## 3.2 METHODOLOGY

First, we conducted a thematic analysis on the comments in the eco forum to identify patterns across the entire dataset that shape processes and experiences. Here, themes were defined as patterns of shared meaning that are united by a central concept or idea (Braun et al., 2014). We also created a map of main themes and sub-theme interconnections to better contextualise the different meanings.

Second, we extracted topics of social influence from the hybrid forums using the PRIN model, the Probabilistic Reasoning system for social Influence analysis (Vega et al., 2021). PRIN is an unsupervised model that quantitatively measures social influence in online social networks. Building on the psychosocial theory of influence and the probabilistic reasoning theory (Pearl, 1988), it extracts topics by accounting for: the user (e.g., the anonymised user's published messages and structural links), content (e.g., bag of words contained in each message), and network (every

user has a unique preference to form a structural link with others based on content or non-content reasons). Results are presented based on word clouds, perplexity scores and model parameters.

Third, we validated our results using the Mean Extraction Method (MEM, Chung & Pennebaker, 2008), which is another LDA-based topic modelling technique that is integrated in LIWC-22.

Forth, we conducted a thematic analysis on the comments of the extracted topics to explore which eco (sub)themes could be used by hybrid eco-fascist groups to promote their ideologies.

## 3.3 RESULTS

### 3.3.1 THEMATIC ANALYSIS OF ECO FORUMS

Results from the thematic analysis on the eco forum indicated two main topics/themes: Understanding ecology as a scientific discipline and human-environment relationship.

#### 3.3.1.1 Understanding ecology as a scientific discipline

This theme included two main subthemes: ecology as a career path and ecology in the "field". The first subtheme delved into career development within ecology. This led to discussions on volunteer opportunities, sharing work experiences and opportunities, advice seeking and arguing whether a specific advice is appropriate or not. Within this subtheme, the extent that physical strength is or should be a requirement of a professional "ecologist" seemed to become a major discussion point. The second

subtheme was related to the science behind climate change and heavily relied on recommending links to websites, books, and other online informational resources that explain and justify discussion points relative to climate change.

### 3.3.1.2 Human-environment relationship

This theme included several subthemes including the influence of human behaviour on animals, species identification, nuclear power and threats to ecology, urban ecology, and overpopulation. Our analysis showed that preventing destruction was a key sub-theme that connected the two main thematic topics. This sub-theme included discussions about the ways that destruction can be prevented, and potential solutions driven by human actions.

### 3.3.2 TOPICS OF INFLUENCE FROM THE HYBRID FORUMS

Topics of influence from the hybrid forums were identified computationally using PRIN, Probabilistic Reasoning system for social Influence analysis (Vega et al., 2021). The performance of our PRIN model was assessed using the log-likelihood (how well a model fits the observed data), perplexity (a measure of model generalization performance), and best model's parameters. Higher scores of log-likelihood indicate better performance. Lower scores of model perplexity indicate better performance.

Results suggested that the best model that fitted our data included 2 components (or topics), log-likelihood = -76600.2, perplexity = 1679.34.

A within-topic investigation of components based on word frequency indicated that the words "people, say, world, country, want, oppressing, live" were among the most frequent in Topic 1, whereas "fascism, right, state, national, use, know" were among the most frequent in Topic 2. Figure 2 and Figure 3 present a word cloud of both topics based on word frequency. It seems that Topic 1 tends to reflect intragroup negotiations and membership justification. Topic 2 tends to have a clearer ideological stance.



*Figure 2. Word Cloud for Topic 1*

*Figure 3. Word Cloud for Topic 2*

### 3.3.3 VALIDATING THE EXTRACTED TOPICS USING MEM

The same text data from the hybrid forums which we used to fit the PRIN model, were also fitted using the Mean extraction method (MEM) that performs a topic modelling in LIWC-22. Given that the pre-processing of the data between the two models is different, for the validation, we performed a more rigorous cleaning process to introduce a more parsimonious model. After extracting the words (topics in MEM) based on frequency, we performed a principal component analysis to test whether the results are consistent with the PRIN findings.

Results suggested that words loaded more than .20 (benchmark) in Topic 1 included: people, leave, white, mean, power, man, conservative, represent, country, group. Words that loaded more than .20 in Topic 2 included: ideology, government, nazi, nationalist, political, leftist, culture, right, free, nation, socialism, war. These results are consistent with the PRIN model. The first factor seems to be more relevant to intragroup dynamics and narratives. The second factor seems to be more relevant to formal ideological/political positioning.

### 3.3.4 THEMATIC ANALYSIS OF THE EXTRACTED TOPICS FROM HYBRID FORUMS

A qualitative inspection of the extracted topics confirmed the results from the natural language processing techniques. There was one main theme that derived from analysing the comments in Topic 1, defined as identity manifestation. This comprised the sharing of common perceptions of existential threats, beliefs in relation to these threats, and negotiating solutions.

- Existential threats included (1.) immigration that they argue increases consumption of natural resources and pollution through a growing population (see also Macklin, 2022); (2.) energy production and exhausting natural system services that are argued to emerge from an increasingly developed global south. Also, environmental degradation and the shutdown of nuclear power plants was among the ideas discussed within this topic.

- Beliefs in relation to these threats included a nationalist duty for environmental conservation, beliefs about the incapability of social justice or democracy to address these threats and the idea

that race and the environment are intertwined with the national ecology and history.

- Within these interactions, suggested solutions included, more generally, ensuring the safety and continuance of the nation as an act of environmental defence against overpopulation and mass immigration. Additional references were made for a palingenesis to bring about "true" environmental sustainability, and anti-globalization (see also Hughes et al., 2022 for a similar discussion).

Much of the narratives within this topic are targeted against "globalists and lefties" who are portrayed as evil for ecosystems. In social identity terms, this creates an intergroup conflict and an "us versus them" way of thinking that contributes to the formation of a stronger shared identity (e.g., Smith et al., 2020).

With regards to Topic 2, the theme that derived from our qualitative analysis was associated with the ideological underpinnings of eco-fascism. This was related to the ideological and historical positioning of eco-fascism in relation to the environment and the extreme right.

## 3.4 CONCLUSIONS

First, our findings suggest that the science behind climate change and the relationship between humans and the environment are the main themes that attract attention within the eco forums investigated in this study. Environmental threats constitute a major sub-theme in human-environment relationships within the eco forums. In exploring topics of influence within the hybrid forums, the analysis found environmental dilemmas or threats are central to their hybrid identity manifestation. Albeit different in content and positions, the common occurrence of this theme means that environmental threats can become an entering point for hybrid group members to spread far right ideas within ecology forums. Second, informational resource sharing is frequently used by eco-fascist groups online (Hughes et al., 2022). Our research suggests that this is also common in the eco forums. Sharing information via posting links tended to be used in eco forums to inform each other about ecology science. This type of exchange may allow hybrid groups to introduce their ideas using the same means. Discussions about threats to endangered species, threats from nuclear power, and overpopulation may open up new opportunities for hybrid eco-fascist groups to enter eco movements.

# 4. ASSESSING NORMATIVE INFLUENCE IN ECO & ECO-FASCIST FORUMS

## 4.1 INTRODUCTION

This study examined how norms guide the influence of the hybrid identity. Norms are subject to social reality testing (Prentice & Paluck, 2020) and more influential when they derive from within the group (Reicher et al., 2010). To spread their ideology in eco forums, hybrid eco-fascist members would need to adapt the type or linguistic features of norms they use to align with the targeted community.

Research on normative influence has shown that behaviours are mobilised by: 1) Descriptive norms (which reflect what other group members do); 2) Injunctive norms (which specify what ought to be done); 3) Trending norms (which reflect which behaviour is becoming popular) (Cialdini & Jacombson, 2021; Mortensen et al., 2017); and 4) Moral norms (which specify moral values that are shared by ingroup members) (Pagliaro et al., 2011). Such norms can be traced in online posts, including those made in extremist communities. As social constructs, norms are communicated through language to exert influence (Cialdini, 2003). To understand how norms, as linguistic social constructs, unfold within these online communities, we asked:

1.  Are there differences in the use of these types of norms between the eco forums and the hybrid forums?

2.  What are the differences and similarities in the psychometric properties of the language used in each norm type?

## 4.2 METHODOLOGY

To identify and automatically extract norms based on their linguistic features, we needed dictionaries of the words associated with each norm type. For moral norms, we used the dictionary that is integrated in LIWC-22 that has been reliably tested and validated through a series of studies (Boyd et al., 2022). Dictionaries for descriptive and injunctive norms were constructed based on social linguistic literature. This body of research has shown that descriptive norms fit the concepts of usuality (how often) and typicality (how typical/prevalent) in systemic functional grammar (Halliday et al., 2004), whilst injunctive norms reflect the concept of social obligation and needs, and, thus, are associated with deontic modality in systemic functional grammar (Halliday et al., 2004; Nuyts & Van Der Auwera, 2016). This research identified the words that systematically represented these concepts (Halliday et al., 2004; Jacobson et al., 2012), which were used as a dictionary for detecting descriptive and injunctive norms, respectively. For trending norms, we used Sketch Engine, a tool that uses algorithms to analyze texts of billions of words to identify and extract the instances of interest. Our dictionary consisted of the top 20 words that were identified to be most frequently used in relation to a trend in this corpus.

These dictionaries were then used to inform Contextualizer in LIWC-22. The Contextualizer is a technique that takes a list of words and analyses the dataset to show you the context in which your selected words appear (Boyd et al., 2022). We integrated our dictionaries into the Contextualizer and extracted the associated linguistic constructs of norms. By using this method, we extracted the descriptive, injunctive, trending and moral norm contents from the ecology

forums and the hybrid forums. After cleaning for duplicates, the extracts of norms from the hybrid forums were n = 637 moral norms (45.8% of total extracted norms), descriptive norms n = 318 (22.9%), injunctive norms n = 329 (23.7%), and trending norms n = 84 (6.5%). The extracts from the eco forums were moral norms n = 788 (15.4%), descriptive norms n = 1677 (32.8%), injunctive norms n = 1076 (21.1%), and trending norms n = 900 (17.6%). By comparing how the eco and hybrid communities coordinate the use of language for these types of norms, we aimed to explore whether adopting similar types of norms could function as another means of influence between the online communities.

## 4.3 RESULTS

First, we examined the overall similarity of language used to construct these four types of norms between the eco and hybrid forums. To do so, we used the Language Style Matching (LSM) technique in LIWC-22 (Ireland et al., 2010). We compared each norm construct as extracted from the Contextualizer with the remaining extracts of the same norm type and calculated the

Mean LSM for each norm type in the eco forums and hybrid forums, respectively. High language style matching in one norm type is an indicator of the degree of linguistic style similarity of norms between groups, and has been shown to influence behaviour (e.g., Gonzales et al., 2010). A series of independent t-tests suggested that there was no significant difference in Language Style Matching between the eco and hybrid forums in relation to descriptive, moral and trending norms ($p > .05$). With regards to injunctive norms, the eco community had higher LSM scores compared to the hybrid community, $t(657) = 3.15$, $p = .002$, 95%CI [0.01, 0.04], Meco = 0.41(SD =0.11), Mef = 0.38(SD = 0.11). This result suggests that the eco community showed more conformity in the way they construct injunctive norms compared to the hybrid community.

Second, we used time series analysis to create a graphical examination of how these norms evolve over time. Graphical inspection suggested that these types of norms tend to be combined in narratives over time. For illustrative purposes, Figure 4 depicts how norms occur over a period of 12 moths in the hybrid forums.
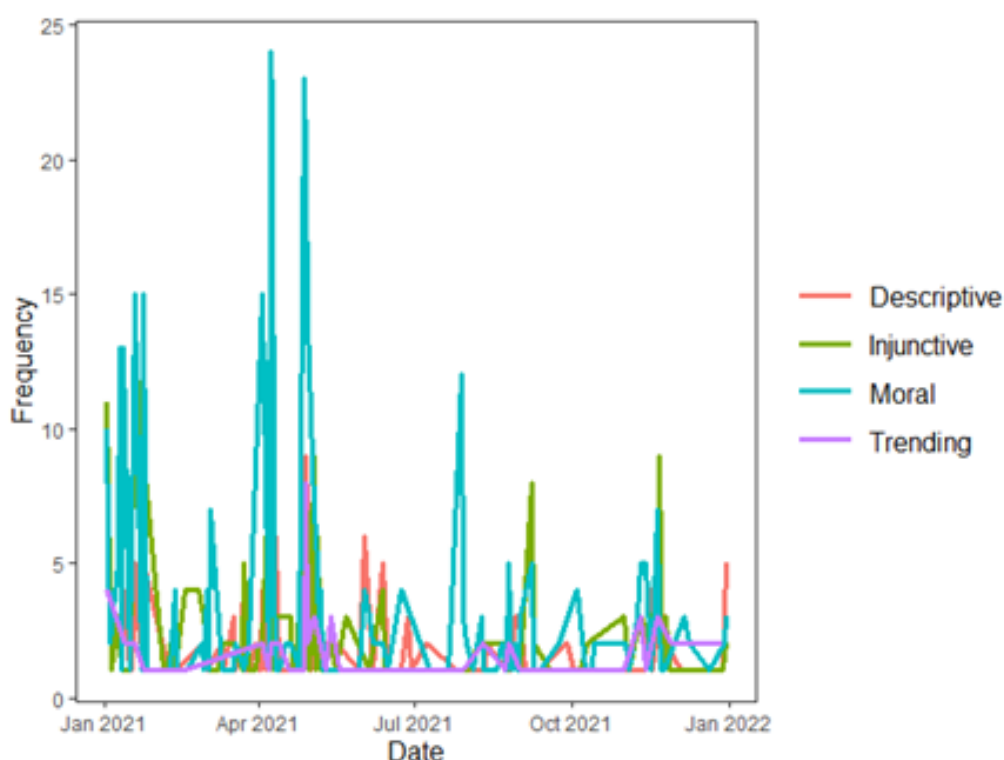


*Figure 4. Norm Occurrence over a One-year Period in Eco-fascist Forums*

Third, we examined the psychological states as shown by the linguistic features of each norm type and explored differences in these psychological states between the eco and hybrid forums.

The psychometric properties of the linguistic features used were investigated by conducting a psychological analysis in LIWC-22. This analysis uses specific linguistic features to produce percentages of total words within a text. We used the following linguistic features:

- Analytic Thinking: This reflects the deliberate thinking and deconstruction of complex concepts into manageable components (Jordan et al., 2019).

- Clout: This is related to the relative status of actors in social interactions (Jordan et al., 2019).

- Authentic: A linguistic feature of genuineness and perceived honesty (Boyd et al., 2022).

- Big Words (long words, e.g., vehemently, palingenesis): People who use a high rate of big words tend to be less emotional and oftentimes psychologically distant or detached (e.g., Tausczik & Pennebaker, 2010).

- Affiliation, Achievement, & Power: These linguistic features has been found to be related to the expression of a shared/collective identity (e.g., Gulliver et al., 2021).

- Culture: It includes words from three domains, politics, ethnicity and technology (Boyd et al., 2022).

For example, if our analysis indicated a score of 1.50 for analytic thinking in a descriptive norm extract of the eco forum that would mean that 1.5% of all words in this extract were indicative of analytic thinking.

In comparing the two communities relative to these features, we found[1] that:

- Regarding the construction of injunctive norms, the eco community tended to use higher clout and achievement-related features compared to the hybrid community. By contrast, the hybrid community tended to use higher power and culture-related features.

- Regarding the construction of descriptive norms, the eco community tended to use more authentic and achievement-related features compared to the hybrid community. By contrast, the hybrid community tended to use higher power and culture-related features.

- Regarding the construction of moral norms, the eco community tended to use more authentic features compared to the hybrid community. By contrast, the hybrid community tended to use higher clout, big words, power and culture-related features.

- Regarding the construction of trending norms, the eco community tended to use bigger words compared to the hybrid community. By contrast, the hybrid community tended to use higher power and culture-related features.

## 4.4 CONCLUSIONS

Our findings suggest that, overall, there were no statistically significant differences in the ways the two communities coordinate the use of language for three types of norms (descriptive, moral, trending), except for injunctive norms. Our findings suggested that the eco community showed more conformity in the way they constructed injunctive norms compared to the hybrid community. Relative to social identity, conformity is often related to authority or status (Spears, 2021). This is consistent with our results that this type of norm tended to include more clout and achievement-related

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1    The relationships presented here were statistically significant at the p = 0.05 level.

linguistic features in the eco community. Clout has been found to be an indicator of one's status and power. Achievement is an indicator of group efficacy (Gulliver et al., 2021). In combination, these features suggest an attempt of the eco community to re-establish their status and their group identity. Higher authentic features in descriptive and moral norms, adds to their identity formation by communicating what is typical of ecology as a scientific discipline or movement and potentially avoidance of deception as shown by the use of language (Tausczik & Pennebaker, 2010).

By contrast, the hybrid community showed a consistent pattern of using more power and culture-related linguistic features than the eco community when constructing norms. Given that politics, national, ethnic, racial and anti-technology narratives shape the eco-fascist ideology, constructing all four types of norms using consistently these linguistic features can be seen as a way to strengthen their identity.

Differences in the similarity of norm construction and consistency in the psychological underpinnings of norm constructs used by the hybrid community are likely to facilitate the communication of their ideas in eco movements.

# 5. CONCLUSIONS & FUTURE DIRECTIONS

This project provided initial evidence on the concept of hybrid identities and their potential to exert influence in online settings. Following theory-driven computational modelling, application, and analysis interpretation, the findings suggest that a hybrid identity is associated with the "blending" of different ideological underpinnings that tend to create a distinct social category. By capitalising on social identity principles and structural dynamics, our studies sought to explore how hybrid groups express and practice their identities to exert influence online. The findings suggested:

- A hybrid eco-fascist identity included features of both identity types (Study 1).

- When there were changes in the context of the discussion, the hybrid group tended to adapt which identity would be salient and their linguistic style to align with the prevailing context (Study 1).

- Hybrid eco-fascist communities tended to use topics in their narratives that are shared among ecological movements (Study 2).

- In combining computational and qualitative techniques, these topics can be identified and explored in a theory-driven way (Study 2).

- Eco communities tended to show a higher linguistic style matching for injunctive norms compared to the hybrid communities (Study 3).

- An investigation of psychological properties of the linguistic features of these norms showed that the eco-fascist group tended to construct these types of norms to consistently impose their ideologies, whereas the eco group tended to construct norms in order to re-establish their identity and social status (Study 3).

These findings speak to the role of hybridity as a means of resilience of extreme groups in online environments. In our project, a hybrid identity seems to be characterised by a capacity to adapt its communication styles in line with the context in which it is expressed. Specifically, (i) shifts in identity salience and writing behaviour, (ii) the use of eco topics to disguise the far right ideas, and (iii) consistency in the psychological construction of norms embedded in linguistic styles, have been identified in this project as potential mechanisms of influence of hybrid identities.

Given that these studies are only the first step in the investigation of hybridity in online settings, future research needs to combine natural language processing techniques with experimental and qualitative work to further explore the mechanisms and consequences of hybrid identity influences in online communities. By using data from online communities where the infiltration of eco-fascist narratives has already been detected, we aim to make use of the presented results to further examine the permeability of the hybrid identity and the direction of its change. We report some of the research questions that could benefit from future research:

1. Directionality: How do hybrid group members that join a moderate community use stylistic features to become accepted rather than being rejected?

2. Efficacy: Which linguistic strategies in terms of style are most effective in re-shaping the community and exerting extremist influence?

3. De-radicalisation: Can interactions with moderate communities initiate de-radicalisation in hybrid extremist members? If so, can we detect this through a change in writing behaviour?

We expect this follow-up research to extend the presented work theoretically, methodologically, empirically, and practically by contributing to an evidence-based assessment of the hybrid identity dynamics that are effective in strengthening or weakening the online influence of hybrid communities. As such, this follow-up research would add to another form of resilience, that of transformability.

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