Differences and similarities between pluralistic ignorance and majority illusion in social networks

Bachelor's Project Thesis

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Abstract: This thesis investigates the phenomena of pluralistic ignorance and the majority illusion, exploring how these mechanisms distort perceptions of public opinion within social networks. Pluralistic ignorance occurs when individuals privately reject a norm but publicly conform, misjudging others' true beliefs due to social pressures and limited visibility of dissent. The majority illusion arises from network structures where minority opinions gain outsized visibility through highly connected individuals, skewing perceptions of consensus. By analysing properties of social networks, such as clustering coefficients, degree distributions, and different dimensions, this work compares the two phenomena, highlighting their similarities and differences. One of the key differences is where the distortion comes from in each of the two phenomena, since one is driven by what we fear inside, and the other by what the network shows on the outside. Examples and theoretical models illustrate how the amplification or suppression of minority opinions are influenced.

1 Introduction

This research aims to explore and compare two phenomena that have significant implications for how individuals perceive social realities: pluralistic ignorance and the majority illusion.

1.1 Definitions

Pluralistic ignorance was introduced by Katz & Allport (1931) to describe situations in which nearly all the members of a group privately reject a norm but mistakenly believe that most of the others accept it. Allport developed this concept to explain a phenomenon: the widespread public conformity to social norms despite a lack of genuine private endorsement. D. T. Miller & McFarland (1987) proposed that pluralistic ignorance arises most commonly in situations where individuals attribute their own behaviour to a fear of embarrassment, but do not assume the same motive applies to others.

In other words, pluralistic ignorance is a phenomenon in which individuals mistakenly believe that their own beliefs, behaviours, or feelings are different from those of the majority, when in reality, the majority shares the same beliefs. This misperception leads individuals to conform to adhere to perceived norms that do not truly exist, often suppressing personal expression and opinion.

Pluralistic ignorance was used to explain why bystanders fail to act in emergencies (D. Miller & Prentice, 1994) and why college students tend to overestimate alcohol use among their peers (Baer et al., 1991; Berkowitz, 2005; Prentice & Miller, 1993).

The majority illusion was introduced by Lerman et al. (2016), who studied the existence of social networks in which most agents will observe a majority of their neighbours belonging to a certain binary type, despite that type being rare across the entire network. The first agents mentioned acquire the wrong perception, meaning, the illusion, so the majority type is different from the true distribution within the network.

The majority illusion occurs when individuals perceive a belief, opinion, or behaviour as more widespread than it truly is. This misperception arises primarily from the visibility or prominence

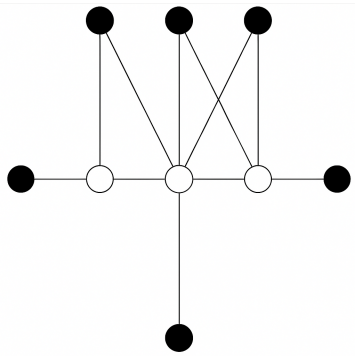

Figure 1.1: An instance of majority illusion. The well-placed white minority is seen as a majority by most of the nodes.

of certain individuals, groups, or behaviours that disproportionately influence the perception of the overall majority. As a result, this illusion can create a false sense of consensus, leading individuals to adopt or reinforce beliefs they believe to be widely accepted, even if they are not. Essentially, even if only a small group of individuals holds a particular view or acts in a certain way, their high number of connections with others can lead to the perception that "everyone" shares that view or behaviour.

In other terms, when the majority of the network nodes belong to a certain type but the majority of each nodes's neighbours belong to a different type, a wrong perception emerges. An example of this is shown in Figure 1.1. In the figure, the nodes represent individuals and the edges represent their social connections. The two distinct node colors, black and white, correspond to different types of agents. The black nodes form the majority and the white nodes form the minority. However, the highly connected white nodes, which are central and well-placed agents, create a false perception for the black nodes, leading them to believe that white nodes constitute the majority.

Both concepts have been studied across multiple disciplines, like psychology, sociology, and communication studies. They shape the way collective behaviour and decision-making within social networks are understood, whether they are real-world communities or virtual online platforms. While both concepts deal with misconceptions of majority opinions, they manifest in different ways and have distinct consequences for the way groups behave, spread information and form social norms.

In the context of the two phenomena, pluralistic ignorance and majority illusion, **social networks** operate as platforms where individuals influence each other, by reinforcing or challenging established norms. Social networks are systems of interconnected individuals or groups that facilitate the exchange of information through relationships and interactions. These networks can be both online, like social media platforms and offline, such as communities, and they play a crucial role in shaping behaviours, beliefs and social norms. The structure of these networks, specifically the connections between the nodes, impacts how information spreads, how decisions are made and how collective behaviours form.

1.2 Relevance of the Research

The primary goal of this research is to identify the similarities and differences between the two phenomena, pluralistic ignorance and majority illusion, within the context of social networks. It will compare them by examining their mechanisms and effects within social networks. Both phenomena involve distorted perceptions of what opinions or behaviours are common, but they differ in key ways: pluralistic ignorance arises from individuals' misperceptions of others' private beliefs, while the majority illusion results from structural biases in network connections.

There has been little work that directly compared the two phenomena or analysed their combined effects within social networks. This thesis aims to bridge that gap by providing a comparative analysis, grounded in a theoretical framework and structural insights from social network analysis. Understanding how pluralistic ignorance and the majority illusion manifest and how they influence individuals' perceptions and beliefs, is important for improving our understanding of social influence, group dynamics and the spread of information (or misinformation). By examining these phenomena in the context of social networks, this research provides a perspective on how group behaviour is shaped and how social norms are created.

This paper will also show how the structure of social networks can amplify the impact of both pluralistic ignorance and the majority illusion on the

present individuals in the social network. People are often exposed to only certain perspectives, creating a skewed sense of consensus Lerman et al. (2016). Understanding how these phenomena work within social networks can help develop more effective strategies for combating misinformation, reducing polarization and fostering more inclusive and informed public discussions and beliefs.

2 Preliminaries

This section introduces the foundational concepts of social networks that are essential for analyzing pluralistic ignorance and the majority illusion. It formally defines key metrics and explores the theoretical grounding of the two phenomena.

Pluralistic Ignorance

Definition. *Pluralistic ignorance* is a psychological phenomenon in which a majority of individuals privately reject a norm but incorrectly assume that most others accept it, leading to widespread public conformity despite private disagreement. This concept was first introduced by Katz & Allport (1931), who observed that individuals often misinterpret the behaviour of others as reflecting genuine belief, even when those others are also conforming outwardly due to social pressure.

Formally, pluralistic ignorance occurs when:

- A significant number of individuals privately hold opinion A,
- But believe that the majority holds opinion B,
- Resulting in public adherence to B, even though A is more prevalent.

This discrepancy between private beliefs and public behaviour sustains a false norm, contributing to the suppression of widely held but privately expressed opinions.

Majority Illusion

Definition. An agent $i \in V$ in a social network is under a majority illusion if the majority opinion observed in its local neighbourhood differs from the majority opinion in the global network.

Let $G = (V, E)$ be a graph representing the network, with each agent $i \in V$ assigned a binary opinion $c_i \in \{A, B\}$. Let N_i be the set of neighbours of agent i, and let M_{N_i} and M_V denote the majority opinion in the local neighbourhood and the global network respectively. Then, an agent $i \in V$ is under a majority illusion if $M_{N_i} \neq \text{tie}$, $M_V \neq \text{tie}$, and $M_{N_i} \neq M_V$.

This means that both the local and global majorities are well-defined, but differ from each other. As a result, agent i misperceives the actual prevalence of opinions due to biased local sampling (Venema-Los et al., 2023).

2.1 Social Network Representation

Social networks are represented by graphs, in which individuals are nodes and their connections are edges. This representation allows the application of mathematical tools from graph theory to study how beliefs and perceptions spread and are distorted within a network. More specifically, it enables a systematic exploration of the influence of the network on individual perception, norm formation and opinion dynamics.

Formally, a social network is represented as $G = (V, E)$, where V is the set of individuals in the network, and $E \subseteq V \times V$ is the set of edges indicating social connections.

2.2 Network Properties

Some structural properties of networks are essential for understanding the mechanisms behind pluralistic ignorance and the majority illusion:

The **Degree** k_i of a node $i \in V$ is the number of edges connected to it:

$$k_i = |\{j \in V : (i, j) \in E\}|$$

Nodes with high degree have more social connections and tend to be more visible in the network. These nodes can disproportionately affect perceptions of consensus, playing a key role in the majority illusion.

The **Degree Distribution** $P(k)$ is the probability that a randomly selected node has a

particular degree k:

$$P(k) = \frac{|\{i \in V : k_i = k\}|}{|V|}$$

The **Clustering Coefficient** C_i of node i quantifies the extent to which its neighbors are interconnected:

$$C_i = \frac{2e_i}{k_i(k_i - 1)}$$

where e_i is the number of edges between the k_i neighbors of node i. The average clustering coefficient C across the network reflects local cohesion. Local cohesion refers to how tightly connected a node's immediate neighbourhood is within a network. It describes the extent to which a node's neighbours are also neighbours of each other. High clustering can reinforce local norms (expectations) and help sustain pluralistic ignorance by reinforcing local conformity (Watts & Strogatz, 1998).

In many real-world social networks, the distribution of node degrees is not uniform or normally distributed, but instead highly unequal. Such networks have a **highly skewed degree distribution**, meaning that while most nodes have relatively few connections, a small number of nodes, called hubs, have extremely many. This structural inequality is central to the formation of perceptual distortions in networks, such as the majority illusion.

A particularly well-known class of highly skewed networks are the **scale-free networks**, first introduced by Barabási & Albert (1999). An example of such a network can be seen in Figure 2.1. Such a model is based on two principles:

- *Growth:* The network expands over time through the addition of new nodes.
- *Preferential Attachment:* New nodes are more likely to connect to existing nodes with higher degrees.

These mechanisms result in a degree distribution that follows a power law:

$$P(k) \propto k^{-\gamma}$$

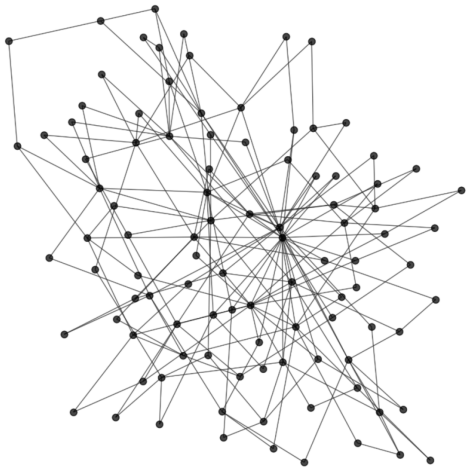

Figure 2.1: An example of a scale-free network created using the Barabási-Albert model. Most of the nodes have a small number of connections, while a few nodes have a significantly larger number of connections.

where $P(k)$ is the probability that a randomly selected node has degree k, and γ is a constant typically in the range $2 < \gamma < 3$. This implies that although most nodes have a small number of connections, a few nodes (hubs) have an exceptionally large number, making the network scale-free.

What scale-free networks and highly skewed networks share is their structural asymmetry, which can significantly affect information visibility and belief perception. In particular, these hubs are often disproportionately observed by other nodes, which lead to majority illusion (Lerman et al., 2016), where a behavior held by a few highly connected nodes appears widespread.

Thus, highly skewed and scale-free networks play an important role in this research by enabling a structural distortion of social reality: the amplification of minority views via topological prominence.

2.3 Assumptions and Limitations

To maintain analytical clarity, this research adopts the following simplifying assumptions.

Social networks are treated as static structures. While real-world networks evolve over time, a static approach allows for the isolation and comparison of structural and cognitive effects.

This study does not involve primary data collection or surveys. Instead, it relies on theoretical modelling and analysis of existing literature and models.

Although many studies on opinion dynamics rely on simulations, this thesis focuses on conceptual and comparative modelling. It refers to existing simulation-based results to support key points where appropriate.

Therefore, these constraints are acknowledged and help delimit the scope of the study while preserving its theoretical depth and relevance.

3 Results

Drawing upon established literature, graph theory and social network analysis, this Results section offers a comparative analysis on the mechanisms, manifestations and consequences of majority illusions and pluralistic ignorance. It examines how they operate independently and together. This analysis addresses the central research question: "What are the key similarities and differences between pluralistic ignorance and the majority illusion, and how do they influence the amplification or suppression of minority opinions?". The results are organised to highlight the similarities and differences across different dimensions, including their dependency on specific graph structures and properties of social networks, such as network connectivity patterns, node centrality, and clustering. Additional attention is given to the effects of the two phenomena on social perception and their broader consequences for the visibility and expression of minority beliefs.

3.1 Core Differences

To systematically understand how pluralistic ignorance and the majority illusion influence public perception and group behaviour, a comparative analysis is conducted along their key aspects. Although both lead to distorted perceptions of social consensus, they do so through distinct processes.

- Mechanism:

  Pluralistic ignorance arises from a cognitive misperception of others' private beliefs. Individuals mistakenly believe that their own private rejection of a norm is unique, leading them to conform publicly despite internal disagreement.

  In contrast, the majority illusion comes from a structural misperception created by the network's topology. Here, the way nodes are connected distorts the visibility of all the beliefs in the network, causing certain views to appear more widespread than they truly are.

- Origin:

  The origin of pluralistic ignorance is internal, rooted in psychological factors such as fear of social sanction, desire to conform, or lack of safe spaces for open expression. People privately hold beliefs that differ from what they perceive to be the norm, but remain silent due to anticipated disapproval or rejection. As a result, a false consensus emerges: everyone thinks they are alone in their belief, even if many privately agree.

  In contrast, the majority illusion originates from external structural properties of the social network, specifically, local visibility bias. This occurs when a behaviour or belief, although rare globally, is disproportionately visible in individuals' local neighbourhoods. In highly skewed or scale-free networks, nodes with a high degree can make minority-held behaviours appear widespread simply because they are seen more often.

- Manifestation:

  In pluralistic ignorance, individuals conform outwardly to a norm they privately reject, maintaining a false consensus.

  The majority illusion manifests when individuals adopt behaviours or beliefs they perceive as popular, although, in reality, only a minority holds those views.

- Network Dependency:

  Pluralistic ignorance shows a moderate dependence on the social network's structure, particularly within small groups characterised by a high clustering coefficient. In these clusters, individuals frequently interact with close peers who tend to share similar social norms. Because people observe others publicly conforming to certain beliefs or behaviours, even when

many privately disagree, these norms become self-reinforcing and appear dominant. Experimental evidence shows that such clustered network structures facilitate the spread and maintenance of behaviours and social norms by reinforcing local consensus (Centola, 2010). Also, Bergstrom & Bak-Coleman (2019) show that the structure of online social networks can skew individuals' perceptions of public opinion, leading to a phenomenon "information gerrymandering." This occurs when a strategically connected minority has disproportionate influence over the network, causing their views to appear more common than they are. The result is a reinforcement of local consensus and misperceptions, similar to the dynamics of pluralistic ignorance, illustrating how network topology can systematically distort collective decision-making. However, pluralistic ignorance does not depend entirely on the global network structure. Rather, it mostly arises from social pressures and fears of rejection within these local communities.

In contrast, the majority illusion shows a high dependency on specific global network topologies. A special case are the scale-free and highly skewed networks. These networks are characterised by a few nodes with exceptionally high degrees and many nodes with few connections. These nodes have disproportionate influence, and their behaviours or opinions are seen by a large portion of the network. If they hold minority views, their visibility gets amplified, creating the illusion that these views are widespread. The majority illusion thus critically depends on the structural properties of the network, but it can also arise in networks with relatively uniform degree distributions, depending on how behaviours are distributed across nodes.

- Visibility in Social Perception:

  Visibility plays an important role in pluralistic ignorance, since the invisibility of private beliefs (they are hidden) remains largely hidden from others, hence contributing to the appearance of the phenomenon.

  In the majority illusion, visibility is central, since a few well-connected (popular) individuals disproportionately shape the perceived popularity of beliefs, skewing collective perception.

- Effect on Minority Viewpoints:

  Pluralistic ignorance suppresses the expression of the actual majority viewpoints, even when they are widely held but kept private.

  The majority illusion, conversely, amplifies the visibility of minority-held views when those views are held by well-positioned or highly connected individuals.

- Underlying Psychological Process:

  The psychological process behind pluralistic ignorance is the fear of deviance or social rejection, which discourages individuals from expressing different beliefs.

  The majority illusion relies on an illusory consensus created by the structure of the network, where the high visibility of some minority opinions leads to a false impression of widespread acceptance.

Together, these features show how pluralistic ignorance and the majority illusion, while both leading to distorted social perceptions, operate through distinct yet complementary processes, primarily cognitive and internal, and the other structural and external. 'Table 3.1' summarises this comparative analysis and serves as a framework for understanding their specific roles in shaping social dynamics. The contrast highlights the complementary nature of the two concepts. One (pluralistic ignorance) masks agreement with minority views, while the other (majority illusion) makes them seem more popular than they really are.

3.2 Similarities

While pluralistic ignorance and the majority illusion emerge from distinct mechanisms, cognitive misperception and structural visibility bias share key features that contribute to distorted perceptions of social reality. Understanding these similarities shows how both human psychology and network structure can interfere with people's ability to accurately judge what most others truly think or believe.

Table 3.1: Comparison between pluralistic ignorance and majority illusion across key dimensions.

Dimension	Pluralistic Ignorance	Majority Illusion
Mechanism	Cognitive misperception of others' private beliefs	Structural misperception of visible beliefs due to network topology
Origin	Internal: fear of social sanction, lack of open expression	External: local visibility bias
Manifestation	Individuals conform to a norm they privately reject	Individuals adopt behaviors perceived as popular
Network Dependency	Moderate (reinforced by clustering)	High (amplified in scale-free and highly skewed networks)
Visibility in Social Perception	Important; the invisibility of private beliefs	Central; visibility of few popular individuals shapes perception
Effect on Minority Viewpoints	Suppresses expression of widely held but hidden views	Amplifies visibility of minority-held but well-placed views
Underlying Psychological Process	Fear of deviance or rejection	Illusory consensus based on local network structure

1. **Misperception of Social Consensus**

At their core, both phenomena lead to an inaccurate understanding of what beliefs, attitudes, or behaviours are most popular within a group. Pluralistic ignorance involves individuals mistakenly assuming that their private opinion is unique, thereby reinforcing a norm they privately reject, since they adjust their behaviour based on a perceived group consensus that does not actually exist (Prentice & Miller, 1993). Similarly, the majority illusion causes individuals to perceive a minority opinion as widely held because highly connected individuals (nodes with a high degree) disproportionately hold and express it (Lerman et al., 2016). In both cases, individuals' local observations result in global misperceptions, shaping social behaviour based on false assumptions.

2. **Reinforcing Feedback Loops**

Both phenomena are sustained and amplified through feedback mechanisms. In pluralistic ignorance, public conformity by individuals (who believe others support the norm) validates and propagates the norm they privately question, suppressing opposing views even more (D. T. Miller & McFarland, 1987). In the majority illusion, the feedback loop occurs as the network structure causes minority opinions to be disproportionately visible, leading to a skewed perception that these opinions are widespread, which in turn can reinforce their visibility or attention within the network (Lerman et al., 2016; Hodas & Lerman, 2014). These feedback loops lock groups into self-reinforcing social illusions, regardless of the actual underlying distribution of beliefs.

3. **Reliance on Local Observations**

A key structural similarity is that both phenomena rely on individuals forming impressions based on local or partial information. In pluralistic ignorance, this occurs because dissent remains hidden, since people cannot observe others' true private attitudes and thus rely on observable behaviour (Centola, 2010). In the majority illusion, local exposure is biased toward nodes with a high clustering coefficient, which views dominate their neighbourhood; Ugander et al. (2011) show that real-world social networks, such as Facebook's, show strong local clustering, which shapes the visibility and spread of opinions within those neighbourhoods. In both cases, the reliance on samples of the social network leads to misjudgments about the majority opinion.

3.3 Network Topologies

Understanding how social network structures shape collective perception is essential to explaining the

occurrence of pluralistic ignorance and majority illusion. Two distinct types of network topologies, clustered networks with high clustering coefficients and scale-free networks, play important roles in facilitating these phenomena.

In **Clustered Networks** with high clustering coefficient, nodes tend to form tightly connected groups where neighbours are also interconnected, creating dense local clusters (Watts & Strogatz, 1998). In such networks, there is a high local information flow, and individuals predominantly interact within their immediate cluster. This structural property supports pluralistic ignorance by reinforcing local social norms through repeated exposure to public conformity signals, despite private opposition. Within these clusters, the lack of exposure to different opinions reduces opportunities for correcting misperceptions about others' private beliefs. The localized reinforcement leads to stable, self-sustaining false consensus within each cluster, even if the true distribution of beliefs differs (Centola, 2010).

Scale-Free Networks (example in Figure 2.1) exhibit a heterogeneous degree distribution following a power law, where a small subset of nodes, called hubs, have disproportionately many connections (Barabási & Albert, 1999). A heterogeneous degree distribution means that nodes differ widely in how many connections they have. While most nodes have only a few links, a few hubs possess a very large number of connections. This uneven distribution follows a power law, with the probability $P(k)$ that a node has k connections roughly proportional to $k^{-\gamma}$, where γ typically ranges between 2 and 3. This topology is especially facilitating the majority illusion, where minority opinions held by influential hubs become highly visible across the network, leading many nodes to overestimate their prevalence (Lerman et al., 2016). Because many low-degree nodes connect directly to these hubs, the minority view appears disproportionately common in local neighbourhoods, generating a global perception that contradicts the actual minority status of the opinion.

These two types of networks demonstrate that the structural features of clustered and scale-free, selectively amplify different types of social misperceptions: clustered networks facilitate pluralistic ignorance by promoting local conformity and hiding private dissent, whereas scale-free networks create the conditions for majority illusion by enabling a small set of well-connected nodes to skew global visibility of minority beliefs.

3.4 Interaction Effects

When pluralistic ignorance and the majority illusion co-occur, their interaction can drastically distort public opinion. This section outlines two primary interaction types:

(a) **Reinforcement Dynamics**

A challenging scenario can appear when a small but strategically positioned minority opinion, amplified by the majority illusion, is perceived as broadly accepted across the network. Meanwhile, most individuals privately disagree but refrain from expressing their dissent, mistakenly believing they are alone in their opposition, due to pluralistic ignorance. This creates a reinforcing feedback loop: the minority opinion's overrepresentation via highly connected nodes (hubs) boosts its visibility, encouraging public conformity, which in turn suppresses the expression of the actual majority's private beliefs (Centola, 2010). Over time, this can result in a false consensus, making the minority view appear overwhelmingly dominant and discouraging change.

(b) **Opinion Cascades**

Alternatively, the mismatch between individuals' private beliefs and their perceptions of the majority can create unstable social dynamics characterised by opinion cascades. Here, the population initially appears unified behind the visible majority view (due to the majority illusion), but disagreement exists beneath the surface (due to pluralistic ignorance). Once a triggering event, such as a revelation, external shock, or influential dissent, breaks the silence, suppressed minority opinions may suddenly erupt in widespread public expression, cascading rapidly through the network (Centola, 2010). These cascades demonstrate the fragility of the distorted consensus and reveal how pluralistic ignorance masks true opinions until collective behaviours suddenly shift, sometimes dramatically (Mason et al., 2017).

To illustrate the interaction of the two phenomena, 'Table 3.2' categorises four scenarios, evaluating their effects on public and minority viewpoint perception.

Table 3.2: Interactions of Pluralistic Ignorance and Majority Illusion

Scenario	Pluralistic Ignorance	Majority Illusion	Effect on Public Perception	Impact on Minority Viewpoints
A	✓	×	False belief in what the majority seems to support suppresses disagreement	Hidden majority views remain unvoiced
B	×	✓	Minority appears dominant due to structural bias	Artificial amplification of minority viewpoint
C	✓	✓	Reinforced illusion of consensus	Strongest suppression of dissent and spread of false norms
D	×	×	Accurate norm perception	Genuine minority opinions can be expressed and evaluated

Scenario A: Individuals suppress their views due to perceived peer pressure, even though most of them secretly agree. It is mostly common in offline communities with strong social conformity because direct face-to-face interactions, limited anonymity, and close social monitoring intensify pressure to publicly conform, causing individuals to suppress opposing opinions despite privately sharing them. For example, Kuran (1995) explores how individuals in authoritarian or repressive societies often conceal their true opinions due to fear of social sanctions, leading to widespread public conformity despite private disagreement.

Scenario B: A minority appears widespread due to visibility bias. On platforms like X, for instance, a small number of highly connected influencers advocating for a controversial political stance can make it appear dominant within users' feeds, despite broad disagreement among the general population. This structural bias leads many to overestimate the popularity of marginalized opinions, impacting discourse and potentially polarizing opinions (Lerman et al., 2016).

Scenario C: This is the most extreme case, in which structural visibility and psychological suppression combine and create a powerful false consensus. Minority views dominate not just externally but become internalized, skewing public opinion. his interaction is further discussed above in section (a) Reinforcement Dynamics.

Scenario D: An ideal case where perceptions align with actual distributions.

4 Discussion

This research's objective was to explore the similarities and differences between two phenomena, pluralistic ignorance and the majority illusion, within the context of social networks. Even though they are distinct by definition and through their mechanisms, both contribute to a broader issue: the distortion of public opinion within social networks.

By grounding the research on established literature, graph theory and social network analysis, the study highlighted the interplay between individual cognitive biases and structural characteristics of social networks. It stressed how collective misperceptions can emerge and then persist, even in the absence of explicit misinformation.

Throughout the research, it became clear that these misperceptions are not random. They are influenced by several properties of the networks individuals are part of, such as the connections in between the individuals, how visible certain voices are and how information circulates through the system.

Importantly, the thesis referred to the fact that the two phenomena can reinforce one another.

4.1 Broader Implications

By analysing how network characteristics interact with cognitive biases, this research sheds light on the mechanisms that distort collective decision-making. When individuals base their choices on mistakenly assumed social norms, believing that others support ideas they in fact reject, public policy, voting behaviour, and social mobilisation can be significantly skewed. Such distortions can lead to ineffective or even harmful group outcomes.

The findings have direct implications for misinformation management. Pluralistic ignorance contributes to self-censorship, making it difficult to identify true public consensus. Simultaneously, the majority illusion inflates niche opinions, increasing their perceived legitimacy. Together, they can create fertile ground for misinformation to thrive, especially when minority beliefs (e.g., conspiracy theories) are algorithmically promoted and mainstream views are silently withheld.

From a policy perspective, recognising the dual nature of these distortions can make it possible to foster more accurate perceptions. For instance, transparency tools that expose actual distribution of views, like surveys, could help combat pluralistic ignorance. Also, the effects of the majority illusion can be reduced by changing how information spreads on social networks. For example, giving more equal visibility to different voices, rather than always showing the most popular or influential ones, can prevent minority opinions from appearing more common than they really are.

One of the most critical contributions of this research is based on its ethical implications for AI. Social media platforms increasingly rely on AI-driven recommendation algorithms that prioritise content based on engagement, rather than accuracy or representativeness. This algorithmic amplification can intensify both pluralistic ignorance and the majority illusion, by: suppressing opposing but widely held opinions, boosting visibility of vocal but marginal views and encouraging echo chambers and filter bubbles. Future AI systems should be evaluated not only for fairness and bias in content, but also for their broader societal effects, also when it comes to how they shape users' understanding of what others believe.

4.2 Further research

Building on the insights of this study, prospective research ideas emerge.

A direction involves empirical studies using real-world data from platforms like X, Reddit, or TikTok. By combining network analysis with sentiment and belief inference techniques, researchers could attempt to detect pluralistic ignorance, such as widespread private disagreement masked by public silence and majority illusions, like niche views appearing dominant due to influencer visibility. For example, natural language processing could be used to compare public statements with anonymous survey data on private beliefs. Follower networks could be examined for structural biases where minority opinions gain disproportionate exposure. Then, continuous analysis could trace the rise and fall over time, revealing moments of abrupt opinion shifts or corrections. This research idea would also provide valuable tools for platform moderation, policy-making, and media literacy efforts.

Moreover, given the important role of platform algorithms in shaping social perception, another idea could be to design and test algorithmic interventions aimed at combating the false perception of consensus caused by the majority illusion and pluralistic ignorance. These would aim to mitigate visibility bias without suppressing freedom of expression. This could be achieved by implementing diversity-enhancing recommendation systems that intentionally expose users to a wider range of views. Also, there can be implemented transparency tools that show users how popular a belief really is across the platform. Such systems could be evaluated in both simulated environments and real-world platforms, balancing ethical exchange between engagement, user control and accuracy.

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