

# **MEDIA INFLUENCES ON THE DISSEMINATION OF MINORITY OPINION ACROSS HIGHLY INTERCONNECTED NETWORKS**

BY

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# **Abstract**

## **Media Influences on the Dissemination of Minority Opinion Across Highly Interconnected Networks**

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This pandemic has challenged many institutions to adapt their work environments with the new normal. Recently, Filipinos have become more reliant on online media for their needs. Particularly, disseminating information takes less effort with today's technology.

This study works with random geometric graphs for the structure of the networks. Real individuals with their own opinion preference are represented by nodes in the graph. A form of communication between individuals are represented by edges that connects the nodes. These nodes only communicate with the other nodes when they are connected with each other, where they may or may not switch opinion preferences.

This study aims to analyze the effects of majority media representation on the spreading of minority opinion in a highly interconnected network. The results of this paper have identified that the least count of one (1) majority media agent present allows the minority opinion to conquer the perceived majority opinion in a highly connected network. Moreover, initial proportions of 40 minority non-media agents have contributed some of the shortest and quickest time values for the minority opinion to win. Additionally, high connectivity, given by an AND value of 10, enhances the pace of the transmission of minority opinion in such a network. A combination of these three parameters provided the best performing time of 14 795 ticks for this study. Ultimately, for this study, the media dictates the disposition of the population towards one opinion.

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# **Chapter 1**

## **Introduction**

### **1.1 Background of the Study**

Everyone has their own preferences based on their personal beliefs. This thought process is majorly influenced by social interactions made by the individual themselves. Today, socialization became even more crucial as we slowly adapted new ways to interact with each other through digital means. Social media platforms such as Facebook, TikTok, Twitter, and YouTube, to name a few, dominate the nature of media content that we consume daily. These platforms were also developed to be 'personalized', that is, it caters the needs of one person based on their personal dispositions. Through these applications, contemporary and social movements have new means to let their ideas be heard.

Filipinos spend a substantial amount of time of about four hours online. With this record, they have ranked first in the list of countries with the most time spent on social media [6, 15, 39]. There are millions of Filipinos engaging daily with these social media platforms, which is a clear indication of how these people have become attached to this method of media consumption, as well as how they have changed their lifestyle to incorporate this type of social media management. Moreover, with the current conditions that the world is facing, most of the former face-to-face interactions are now being accomplished online. Filipino consumers have now shifted to digital means of shopping, paying bills, money transferring, and more, due to the convenience that these methods provide for them [18, 19]. Not only is it limited to payment and bank transactions, but most, if not all, of the present Philippine broadcast networks have been using the Internet where they have created their own websites to disseminate meaningful, relevant, and reliable information at any time of the day.

With today's technology, it is easier to share information online, and in real time.

Even our local broadcasting network stations have shifted to online means of news reporting. For instance, the topic of national elections was closely monitored by the whole country. People used their social media accounts to spread and gain awareness of what each candidate is capable of and listened to the regular news programs broadcasted on television and radio. Through these means, along with communicating within their social groups, voters can decide and choose the best reasonable candidates for the national positions based on the information that they have gathered.

Studies made by Alvarez-Galvez [1] and Narraido [21] have explored the effects of media influences in their respective papers. Despite their differences in methodology, they had both described that the presence of minority media in networks greatly accelerated the time it took for the minority opinion to spread. Furthermore, they had also established that high connectivity improves the time of minority opinion spreading. Galam [14] also studied opinion spreading in random geometry; specifically, how a consensus is made on a random geometric network given a set population size.

Neumann [26] has also studied human behaviors on opinion formation, to which she proposed the Spiral of Silence Theory which explains why individuals tend to remain silent whenever they feel like their perspectives are in the minority. They argued that our thought processes were mainly influenced by what we hear from our surroundings, i.e., our social groups and the mass media. Another theory, by Ball-Rokeach and DeFleur [9], has described individuals as dependent on media for their personal needs. Syallow [34] stated in their report that this Media Dependency Theory was the first mass communication theory that recognizes the audience as part of the communication process, beside media and society.

This paper uses technical terms to describe the working model being implemented. For example, a random geometric graph is an undirected graph where its nodes are connected by edges and are randomly placed on a metric space. This graph serves as the network structure for the working model. The nodes in the graph represent real individuals who have their own opinion preferences. The connections between these individuals, where they communicate and interact, are represented by edges connecting the nodes of the graph. The main parameters studied for this paper are the proportions of media nodes, which represent the mass media in real life; the proportions of non-media

nodes, which represent real individuals having their opinion preferences, and the values of average node degree (AND), which represent the mean number of connections that each individual has.

## 1.2 Statement of the Problem

Recently, the Philippines has conducted its 2022 National Elections last May 9. With traditional, broadcast, and social media available to almost anyone in the country, the contest for the best candidates were closely followed by the public. Supporters advertising the achievements of their preferred aspirants highly utilized these media platforms, although the credibility of some of these reports are questionable. Again, it is remarkable how much of the nation's population uses various online media platforms, ranking first on the average time spent on social media last 2021 [6]. Similarly, the campaigning teams of these aspirants have also used these online platforms to promote their chosen candidates with as much reach as possible.

Additionally, due to the COVID-19 outbreak, most face-to-face activities have transitioned towards online means to stabilize and lessen the impact of the pandemic on the country's economy. This further proves the point that Filipinos nowadays are more reliant on media, especially social media, to attain their personal needs. In this age of digital technology, media plays a huge role in the formation of one's thoughts. Especially with our technology rapidly advancing, the possibility of everything going online does not seem far from becoming our reality.

Studying such circumstances is a hassle when being dealt with in person. It can also become costly in resources to achieve this type of research traditionally. Fortunately, there are computers that can replicate real-life scenarios, which we can then use to evaluate and predict possible developments of these situations.

## 1.3 Objective of the Study

### 1.3.1 General Objective of the Study

This paper aims to analyze how the majority media, along with the minority media, affect the spread of minority opinion in a highly connected network.

### 1.3.2 Specific Objectives of the Study

This study explores how varying proportions of minority media and majority media affect the success of the minority opinion in such a network. Particularly, this study focuses on:

- measuring the average running time it takes for the minority (or the majority) opinion to be successful for each set of parameters;
- comparing how varying proportions of minority media and majority media affect the success of the minority opinion within a highly connected network.
- analyzing how changing initial values of minority individuals affect the spreading of minority opinion;
- determining which value of AND gives the least running time value;
- defining a combination of the three parameters which provides the least running time value for this study, and;
- identifying a real life example to relate the results of the study.

## 1.4 Significance of the Study

The dynamics of opinion spreading in random geometric networks has provided a practical representation of how opinions are formed and disseminated in real life [1, 14, 21]. Specifically, how minority opinions tend to be silenced into conformity [26]. These researchers have found that the most favorable condition for the minority opinion to become the new majority opinion is with the presence of additional parameters such as committed agents and external media influences. The composition of the network has also affected the minority opinion spreading. That is, having a highly connected network

is the most favorable condition for the minority opinion to win.

Alvarez-Galvez [1] and Narraido [21] have both made use of the minority media in their respective methodologies and analyses. The presence of majority media was yet to be introduced in their models. Moreover, Narraido [21] suggested in their work that the presence of majority media might show significant outcomes regarding this social phenomenon. Alvarez-Galvez [1] also proposed that analyzing real-world social networks, such as Twitter and Facebook, would lead to a useful discovery.

Aside from these technical aspects, the national elections were trending at the time of constructing the proposal for this paper. The results of the elections were interesting, considering that the whole country was anticipating its outcome since the announcements of each candidate's filing of candidacy.

Using these studies and models as references, this paper has analyzed the effects of the presence of majority media, along with minority media, on the spreading of minority opinion.

## 1.5 Scope and Limitation

The scope of this study involves analyzing the effects of majority media on the spreading of minority opinion. Specifically, to identify which proportion of majority media, along with a fraction of minority media, gives the least amount of time for the minority opinion to successfully overpower the perceived majority opinion in a highly connected network. Additionally, the appropriate ratio of agents, with preferences for either the minority or the majority opinion, was also determined alongside the proportions for the media agents.

Furthermore, the values for the AND ranges from six to ten only. These values sets the connectivity of the network for each simulation, and ensures the success of the minority opinion, which are discussed in Chapter 2. Also note that this study has mainly focused on the running time before the minority opinion wins in highly connected network, although the number of failures was still noted. These values are further discussed and established in Chapter 4.

Note that the following results obtained in this study are limited by the parameters

of the model. For all simulations, the total number of non-media agents was set to only 100 agents. Moreover, these agents were further classified into varying ratios of minority and majority. Specifically, the range for the initial values of minority non-media agents is from 10% to 40%. The complements of these values denote the initial percentages for the majority non-media agents. Also, the number of media agents present in each simulation was treated as another separate set of agents and was set to only 10% of the non-media population (in this case, ten media agents). This percentage was then further divided into the proportions of the minority and the majority media preferences. Particularly, these proportions range from 10% to 100% for the minority media agents. Likewise, the complements of these proportions of minority media define the percentages for the majority media agents that coincides it. Furthermore, the number of runs were also set to only 20 and 100 runs for all combinations of media and non-media agents, and AND values. More details on the parameters used for this study are discussed in Chapter 3.

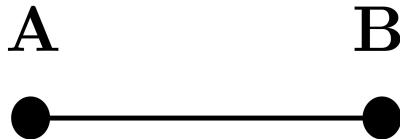
# Chapter 2

## Preliminaries on Various Concepts Used in the Study

In the next subsections, common terminologies used in this study has been discussed in greater detail for the reader to be able to follow the flow of the paper with ease. These concepts consist of mathematical definitions, social constructs, as well as previous research papers supporting the aim of this study. Additionally, a summary of the recent Philippine national elections has been included in this chapter.

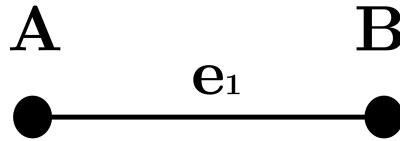
### 2.1 Random Geometric Graph

In mathematics and computer science, a graph is a structural diagram that is composed of points and lines which connects these points with each other.



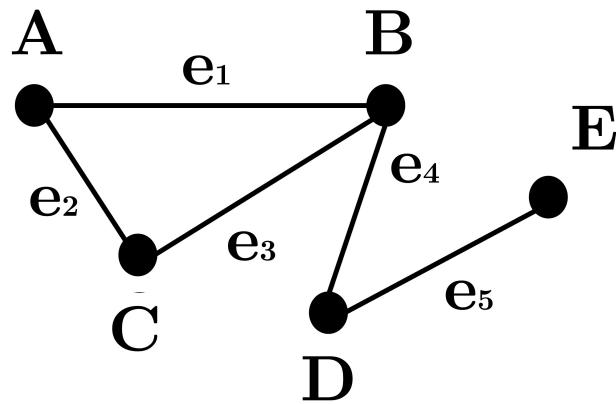
**Figure 2.1:** A diagram with two points  $A$  and  $B$  connected by a solid line.

A point indicates a specific location in a one-, two-, or three-dimensional space. In diagrams, a point is commonly denoted by an alphabet and is represented by a dot. A line serves as a connection between two points, which is often represented by a solid line in diagrams [37]. Figure 2.1 is a simple illustration where point  $A$  is connected to point  $B$  by a line.



**Figure 2.2:** A graph with vertices  $A$  and  $B$  connected by an edge  $e_1$ .

In mathematical terms, a vertex is a point where multiple lines intersect. Another term for vertex is node. A vertex is also like a point where it is represented by a dot and denoted by an alphabet in diagrams. An edge is a more technical term used to describe a line connecting two vertices. Multiple edges may originate from a single vertex to the other vertices present in a graph. However, an edge cannot be formed when there are no starting and ending vertices [37]. Redefining Figure 2.1, the points  $A$  and  $B$  can now be reconsidered as vertices  $A$  and  $B$  connected by an edge  $e_1$  as illustrated in Figure 2.2.



**Figure 2.3:** A graph  $G$  with a set of vertices  $V$  and a set of edges  $E$ .

A graph is denoted by  $G = (V, E)$  where  $V$  is the set that contains all of the vertices and  $E$  is another set containing all of the edges present in the graph [31, 37]. Using Figure 2.3 as an example, the set of vertices is  $V = \{A, B, C, D, E\}$ , and the set of edges is  $E = \{e_1, e_2, e_3, e_4, e_5\}$ ; where  $e_1$  connects vertices  $A$  and  $B$ ,  $e_2$  links vertices  $A$  and  $C$ , and so on. For consistency, this study uses **nodes** and **links** as alternative terms for vertices and edges, respectively.

A random geometric graph, therefore, is an undirected graph formed by uniformly placing  $N$  number of nodes at random on a metric space. In this type of graph, the nodes are connected if and only if their distance does not exceed the radius of the space [12].

## 2.2 Social Contagion in Random Geometry

A study of opinion spreading by Galam has been executed using a diffusion reaction model [14], which is comparable to how a prey-predator model functions. The agents in this model moved in distinct steps across a random geometric graph, which represents a landscape of offices, houses, bars, and restaurants in real life.

Galam has considered a population of  $N$  individuals that can choose to support or reject a reform proposal. At time  $t$ , before the open discourse for the indicated proposal, an initial number of the population  $N_+(t)$  supports the suggested proposition, while the remaining portion  $N_-(t)$  opposes the proposal. Each individual has its own preference, therefore the total population would be represented by the equation:  $N_+(t) + N_-(t) = N$ .

Accordingly, the environmental influence, which has been mathematically expressed in his paper, was indicated as the associated probabilities of each individual that are either in favor or against a proposal:

$$P_{\pm}(t) = \frac{N_{\pm}(t)}{N} \quad (2.1)$$

where  $P_{\pm}$  denotes the probability for the preference of  $N_{\pm}$  in the population at time  $t$ . Galam has also noted that the total sum of the probabilities of both supporting and opposing individuals is denoted by the equation:  $P_+(t) + P_-(t) = 1$ .

This expression has been used to further understand how the environmental influence works and what its purpose is in the dynamics of minority opinion spreading, as mentioned from the Alvarez-Galvez's paper [1].

## 2.3 Network Models of Minority Opinion Spreading

In their study, Alvarez-Galvez has examined four possible scenarios of social contagion: (1) random model, (2) learning-based model, (3) threshold model, and (4) media

effects model. This research has analyzed how the network composition, along with the presence of additional factors such as committed agents and external media influences, affect the circulation and success of the minority opinion. The models of this study differ on how an individual (represented by a node in the network) switches its preference towards one opinion.

Alvarez-Galvez has cited the Barabási-Albert algorithm as their reference for the generation of networks. This algorithm creates a random, scale-free network that makes use of a 'preferential attachment' mechanism that acts as an agent's bias towards one opinion, and it has a tree-like structure for its networks. For each simulation, the number of the population was set to  $N = 1000$ , with 10% of the population representing the minority opinion. Each variation of the models was simulated 100 times to obtain a proper data set.

Alvarez-Galvez [1] has rewritten Galam's Equation 2.1 from the previous subsection into his own interpretation as:

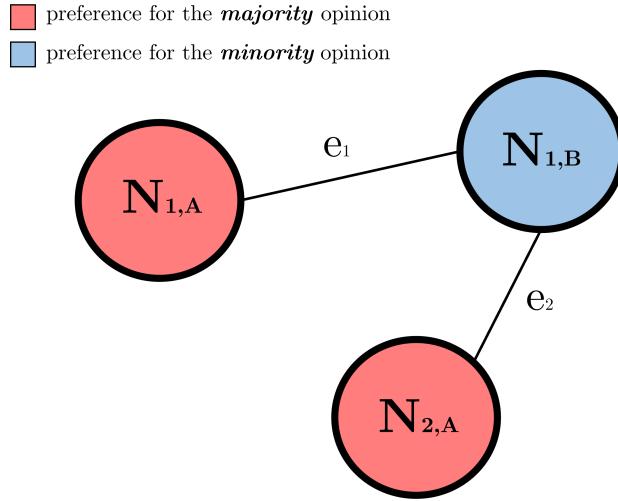
$$c_i = \frac{\sum_j o_{j,i} p_j}{\sum_j p_j} \quad (2.2)$$

where  $o$  denotes the selected opinion with preference  $i$ , and  $j$  denotes the number of the current node. In other words, the above equation indicates the proportion of opinions (majority v. minority) within the populace. This expression will be modified later on in the next chapter, which will define the function of the model of this study.

### 2.3.1 Building the Random Model

The random model of this study is like a social consensus of a group. At each tick of the simulation, a randomly chosen **listener** node can accept the opinion of another randomly chosen **speaker** node.

The following figure helps to visualize how the network would look like.



**Figure 2.4:** An illustration of a graph of linked non-media nodes.

Even though it is a simplified version, Figure 2.4 illustrates how the networks of the random model will appear in future simulations. It is composed of a set of nodes  $N = \{N_{j,i}\}$  that is defined to be a group of individuals  $j$  having their own preferences  $i$  towards one opinion, where each individual is represented by a node. Links connecting these nodes are defined under the set  $E = \{e_m\}$ . The presence of a link  $m$  between nodes indicates a form of communication among these individuals. Through this, they can *interact* and possibly influence the other nodes to change their preference towards the opposite opinion.

In this model, the minority opinion has had difficulty spreading across the network. When additional parameters (i.e., committed agents and high connectivity) were introduced to the network, the chances of minority opinion winning have increased.

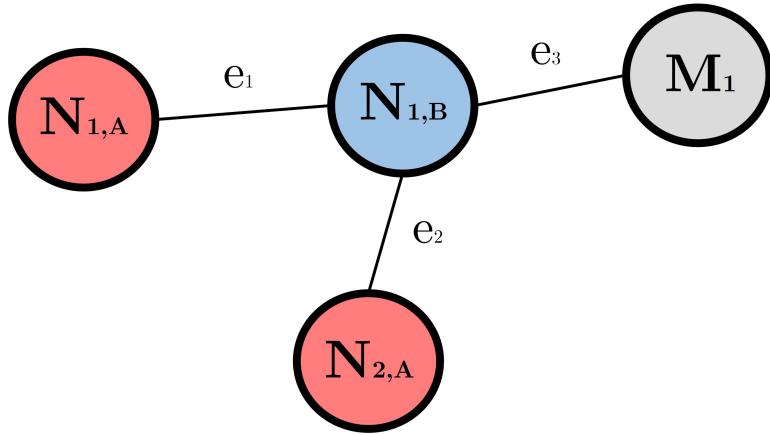
### 2.3.2 Building the Media Effects Model

Similarly, the media effects model is a random model with an additional percentage of distinct media nodes, which represent the mass media in real life. For this study, the media has been set to prefer the minority opinion. The non-media nodes would interact almost the same as in the random model. Although instead of automatically changing preferences, each non-media node first considers the proportions of minority

and majority non-media nodes, which means that one node may not necessarily switch their preferences just yet. The media nodes behaved similarly to the committed agents, wherein these nodes do not change their preferences and it can still influence the other non-media nodes to shift preferences.

With the base network already established from the random model, the media nodes are now added into the network. Figure 2.5 is a simple illustration of how the media nodes are incorporated into the network.

- preference for the *majority* opinion
- preference for the *minority* opinion
- media with preference for one opinion



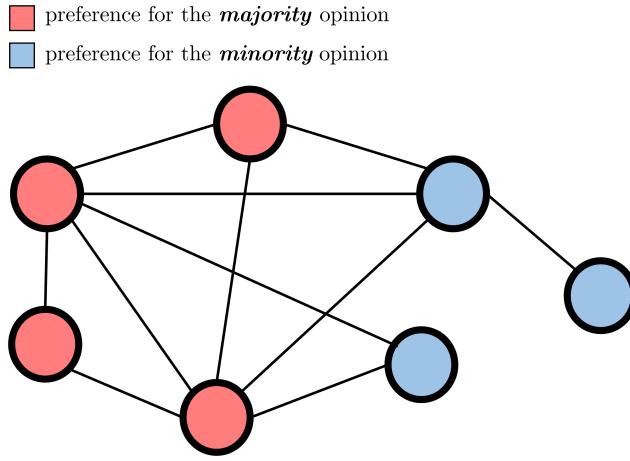
**Figure 2.5:** An illustration of a graph with linked media and non-media nodes.

As presented from Figure 2.5, there now exists a separate set of nodes  $M = \{M_k\}$  where  $k$  is the count of the current media node, that defines the media nodes present in the network. The media nodes symbolize the general mass media in real life. It can be a group of journalists or a sole reporter.

From the results of this study, the minority opinion had a higher chance of success in highly connected networks, along with the presence of additional parameters such as committed agents and media influences. The media effects model, along with nodes of higher degree, has proven to be the most favorable condition for the minority opinion to succeed in spreading.

### 2.3.3 Average Node Degree (AND)

In graphs, the degree of a node is denoted as the number of links connecting this specific node to other nodes in the network; informally referred to as the connectivity of a node [10]. The average node degree (AND) is the mean value of all links from each node. From the observations of Alvarez-Galvez [1] and Narraido [21], the value of AND becomes significant when it is greater than five. This value assures that the minority opinion will succeed against the majority opinion.



**Figure 2.6:** An example of a network with an AND of 3.

Likewise, Narraido [21] has mainly experimented with the random model and media effects model for their report. They have also used Alvarez-Galvez's [1] work as reference for the simulations of their models. The two studies differed in some parameters, such as the initial proportion of minority nodes and the number of runs executed for each model. This study was chosen as a supplementary reference because Narraido has interpreted and defined each parameter in detail. They have also explained how these parameters were applied in replicating the models made by Alvarez-Galvez [1], as well as how the probabilities for switching opinions were derived and how these values were implemented in the different models.

Narraido has tested different values for some of the parameters from Alvarez-Galvez's [1] models. First, the number of the population  $N$  has changed to 100. Then, the initial percentage for the minority nodes have been increased to 30% of the total

population. The networks generated have also been specified to be spatial networks, which made use of the AND values to assign the number of links to each node. Finally, the number of executions has been decreased to 20 runs per variation of the models.

Following the work of Alvarez-Galvez [1], Narraido has made similar observations for the random model and the media effects model with their modified parameters. They have both arrived to the same conclusion. That is, the best condition for the minority opinion to be successful is a combination of a highly connected network with the presence of additional parameters supporting the minority opinion.

Based on these studies [1, 21], as well as from previous empirical research, it has been decided that more attention would be directed towards studying the effects of both minority and majority media, as well as higher values of AND, on minority opinion spreading.

## 2.4 Media Dependency Theory

In their study, Syallow [34] has discussed the theory of media dependency proposed by Sandra Ball-Rokeach and Melvin DeFleur [9]. The paper argued that people in today's modern society tend to rely on media to make sense of the world around them. The theory explains how an individual heavily relies on media to fulfill their needs. Syallow [34] has described the dependency theory as "the first mass communication theory that acknowledges the audience as part of the communication process. This theory expresses a connection among media, its audience, and the society".

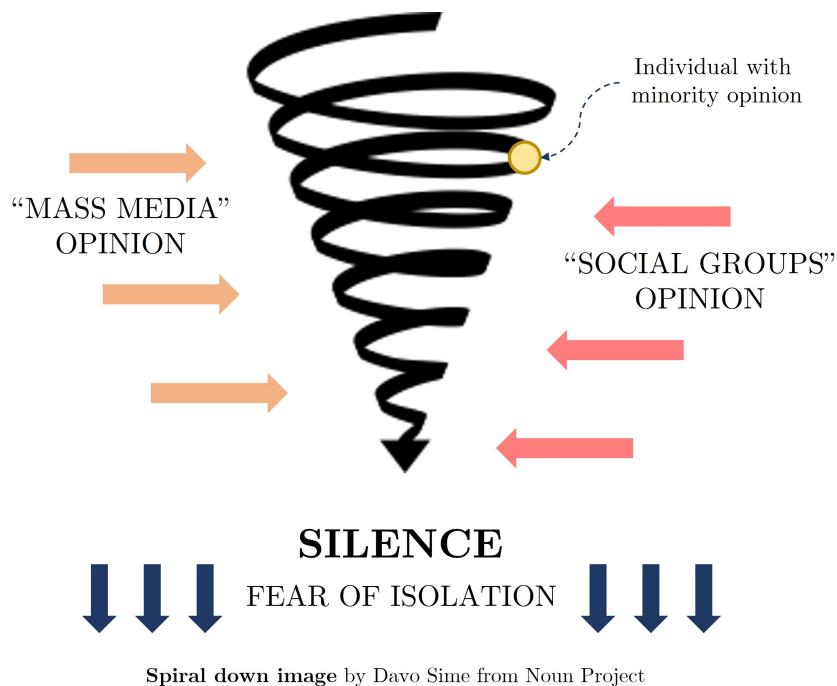
The media dependency theory assumes that the more an individual relies on having their needs satisfied by media consumption, the more significant the role of media has in their life. Although this theory has its own strengths, such as definitiveness and elegance in meaning, the downsides of this theory are that the context of dependency and its strength is too ambiguous for anyone to understand, as well as it is impractical to verify this theory, as everyone is unique with their own personal preferences. Moreover, the theory assumes a lot more from its audiences than necessary, which makes it difficult to quantitatively prove its validity.

This study has been used to help understand how media generally affects the

society, and how individuals depend on the media for their needs. These concepts clarify how the media acts in the network, as well as how an individual reacts upon contact with it.

## 2.5 Spiral of Silence Theory

This theory, proposed by Elisabeth Noelle-Neumann [16, 26, 35], has become a well-explored concept in the field of communication psychology. It states that individuals are more willing to express their thoughts towards others when they believe that they hold the same views with most people in the group [16]. Otherwise, if an individual thinks that their preference opposes the perceived majority opinion, then they will most likely remain silent.



**Figure 2.7:** An illustration of the Spiral of Silence Theory [16, 32]

In this theory, each individual has the capability to gauge the dual "climate" of an opinion, as illustrated in Figure 2.7. That is, an individual's opinion is shaped by (1) the mass media's assertion, and (2) a consensus of their social groups. This ability helps

individuals to speculate what others see as the 'majority' opinion. It influences the way they think and behave; to have a sense of belonging and to avoid isolation [16].

Noelle-Neumann has argued that we all have a fear of being isolated from society. Humans constantly seek validation and acceptance from others, which makes them more susceptible to conformity [11, 16]. The "Spiral of Silence" happens because of this innate fear of rejection that humans have. Furthermore, holding onto such concerns for a long period may lead to poor mental and physical health [11].

This theory has also been briefly discussed in Alvarez-Galvez's paper [1]. Likewise, this idea has helped to explain why people would likely prefer to stay silent when they feel like they have an opposing view to the perceived "majority" opinion.

## 2.6 2022 Philippine Presidential Elections

Last May 9, the Philippines held their 2022 national and local Elections. This year's elections has become the craze for the Filipinos because of the controversial presidential and vice-presidential races that consist of honorable candidates, each equally skilled in their own respective fields.

Specifically, the clash between the newly elected president and former vice president have had a long history considering both aspirants have also competed for the vice-presidential position in the last 2016 elections.

Way back in 2016, the leading candidate in this year's presidential elections was defeated by approximately 260 000 votes, around 0.64% difference with the previous top vice presidential contender [24, 17]. Despite his loss in the 2016 elections, the defeated aspirant has continued to spread his policies and programs through various social media platforms. For example, his YouTube channel, which was created on November 2009, mainly consists of his political stances, entertaining and personal videos, and, most recently, his campaigns and rallies throughout the country [20]. Coincidentally, the former vice president also has a YouTube channel that was formed on September 2015 where she has been uploading her interviews and campaigns since October 2015 [30].

Both presidential candidates for the 2022 elections did their best efforts to advocate their political stances, and to inform the public of the platforms that they have

planned for the betterment of the country, its economy, and its international relationships with the other nations. And yet, the results from public opinion surveys [2, 3, 13, 4, 27, 29, 36], reflected the outcome of the elections where the formerly "minority" candidate from the 2016 vice presidential elections became this year's perceived "majority" candidate for the presidential post. Nevertheless, these pre-election surveys were not intended to mind-condition the voters into choosing a specific candidate, nor to impose on the results of official elections. These were designed to only inform the general public of the nation's current preferences towards each candidate during specific time frames [5, 22]. Moreover, there might also be other factors that could affect the personal preferences of these individuals before the official election day, which might then yield a drastically different outcome from the pre-election surveys.

On the same day as the official election date, the counting of votes began immediately after the closing of voting precincts; and the turnover for the vote canvassing have also been promptly dealt with via the transparency media servers. The voting results were soon made publicly available through television broadcasting and online media [25, 23, 28], where the public can closely monitor the growing number of partial and unofficial votes. Ultimately, the statistics of the pre-election surveys became true, with most of the Election Returns transmitted (98.35%). The leading presidential candidate has won by approximately 31 million votes, with the following contender having an estimate of 15 million votes [25, 23, 28].

## 2.7 NetLogo

The software that has been used to simulate the models in this paper is called NetLogo. It is widely used by students, teachers, and researchers worldwide for its programmable multi-agent environments, and its user-friendly interface and syntax. It can also handle agent-based modeling systems, which is the approach employed for this study [38]. Agent-based modelling is generally used to closely replicate real life circumstances by programming autonomous agents inside a specified and controlled environment [8].

Various creators, that use NetLogo for their personal studies, have made their

works publicly available online. These creators upload their works in the official NetLogo community, where everyone can also contribute their own codes with matching instructions and citations.

After exploring NetLogo, an interpretation of the media effects model has been reconstructed based on the works of Alvarez-Galves [1] and Narraido [21]. This model has retained its code for the most part of this study, with the addition of the media. For the AND application, a built-in model from the Models Library of NetLogo has been used as reference. Under the "Networks" section, the "Virus on a Network" model [33] can be found, This model uses AND for assigning the number of links for each node in its network. It depicts the dynamics of a virus spreading across the computer network.

# Chapter 3

## Methodology

Agent-based modelling was used in this study to imitate and predict behaviors in complex social situations. The previous random and media effects models by Alvarez-Galvez [1] and Narraido [21] were designed to determine the necessary conditions and ensure the success of the minority opinion against the majority opinion.

Using these preceding studies [1, 21] as basis for the model of this study, the methodology has mostly remained the same except for some modifications such as the addition of majority media into the network. More attention has also been directed towards highly connected networks for these simulations.

### 3.1 Basic Parameters

The basic parameters for this study are as follows:

1. A random, scale-free network that consists of nodes and edges, which act as the agents (or turtles in NetLogo) and the links of the network, respectively.
2. A set population of  $N = 100$  interacting agents (which represent individuals in real life).
3. The agents can choose between two opposing opinions, namely the majority and the minority.
4. There are initial percentages of the population set for the minority opinion and the majority opinion. This determines which opinion an agent would be more inclined towards.
5. A variable  $p$  is set to have a value between 0 and 1, depending on the proportions of the minority and majority non-media nodes. This denotes the preference of a node towards one of the opinions.
6. An additional fraction of 10% of the total population will be divided between

the minority media and the majority media. This is a separate set of media nodes, alongside the former set of minority and majority non-media nodes and is not included in the total count of nodes that is considered as the network population.

Recall Alvarez-Galvez's equation 2.2 from the previous chapter. A modified equation was derived from this, which was then used for the simulations of the study.

$$f_i = \frac{\sum_j n_{j,i} p_j + \sum_k m_{k,i}}{\sum_j p_j} \quad (3.1)$$

The overall preference for an opinion  $f$  is expressed as the fraction of the sum of non-media agents  $n_{j,i}$  with their respective preferences  $p_j$  and media agents  $m_{k,i}$  with its corresponding constant preference for one opinion, divided by the preferences of all non-media agents  $p_j$ . Similar to Alvarez-Galvez [1], the first summation  $n_{j,i}$  represents the opinion of the non-media agents  $j$  between two possible choices  $i$  (say,  $i = A, B$ ); namely, the minority (B) and the majority (A). A separate summation  $m_{k,i}$  was also added to the equation for the media agents  $k$  with corresponding opinion  $i$ .

In the executions of the model, this environmental influence denotes when each running time of a simulation stops (i.e., when either the minority or the majority opinion preference goes to zero).

## 3.2 Modifying the Media Effects Model

The media effects model previously established by Alvarez-Galvez [1] and Narraido [21] has been modified to adapt with the changes in objectives for this paper. For the node interactions, a model found in the NetLogo community was used as reference ("Social Consensus - Network" [7]), which depicts how a consensus happens in real life. The networks that have been generated for this study closely resembles the earlier models described from the previous section [1, 21]. An extension of parameters has also been made. Particularly, a separate set of majority media nodes were added into the overall network. Also, the number of links have also been increased for some of the nodes (compared to the previous empirical research) as a result of the implementation of AND. The defining equation for the assigned number of links for each node can be expressed

as:

$$x = \frac{D * N}{2} \quad (3.2)$$

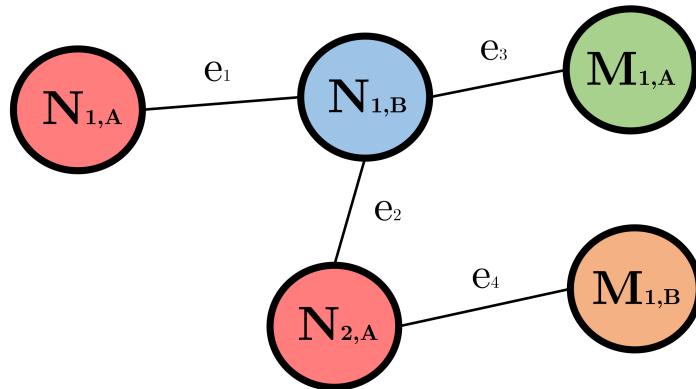
where the possible number of links  $x$  for each node is given by the product of the AND value  $D$  and the total non-media population  $N$  divided by two. An additional reference for the AND application can be located in the Models Library of NetLogo, labeled "Virus on a Network" [33].

### 3.2.1 Proposed Model: Dividing Media Agents into Minority Media and Majority Media

Alvarez-Galvez [1] and Narraido [21] have both focused on the effects of the minority media in their respective studies. For this research, it has been decided that more attention would be aimed towards analyzing the effects of majority media on minority opinion spreading. Specifically, if the minority opinion would still become successful in a highly connected network with majority media present.

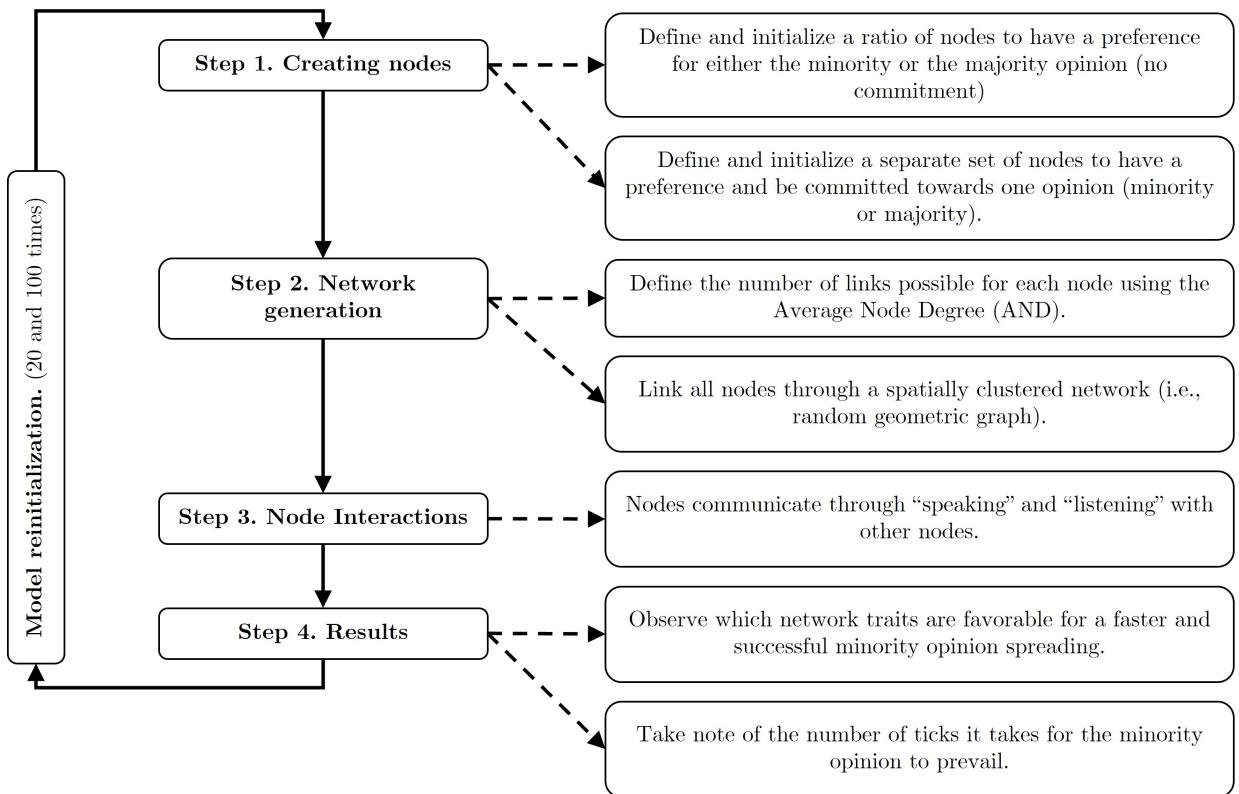
With this, the media node  $M_1$  from Figure 2.5 has been further classified into the minority media and the majority media, as illustrated in Figure 3.1.

- preference for the **majority** opinion
- preference for the **minority** opinion
- media with preference for **majority** opinion
- media with preference for **minority** opinion



**Figure 3.1:** An illustration of a graph with linked minority media, majority media, and non-media nodes.

Here, the set  $M_i = \{M_{k,i}\}$  represents the media nodes with preference  $i$  towards an opinion, where  $k$  denotes the count of the current media node. As previously stated in the works of Alvarez-Galvez [1] and Narraido [21], if a non-media node is connected to a media node, regardless of its preference, then the non-media node will automatically change their choice to be the same as the media's preference. Figure 3.2 illustrates how the model has been implemented in order to get the desired results discussed in the next chapter.



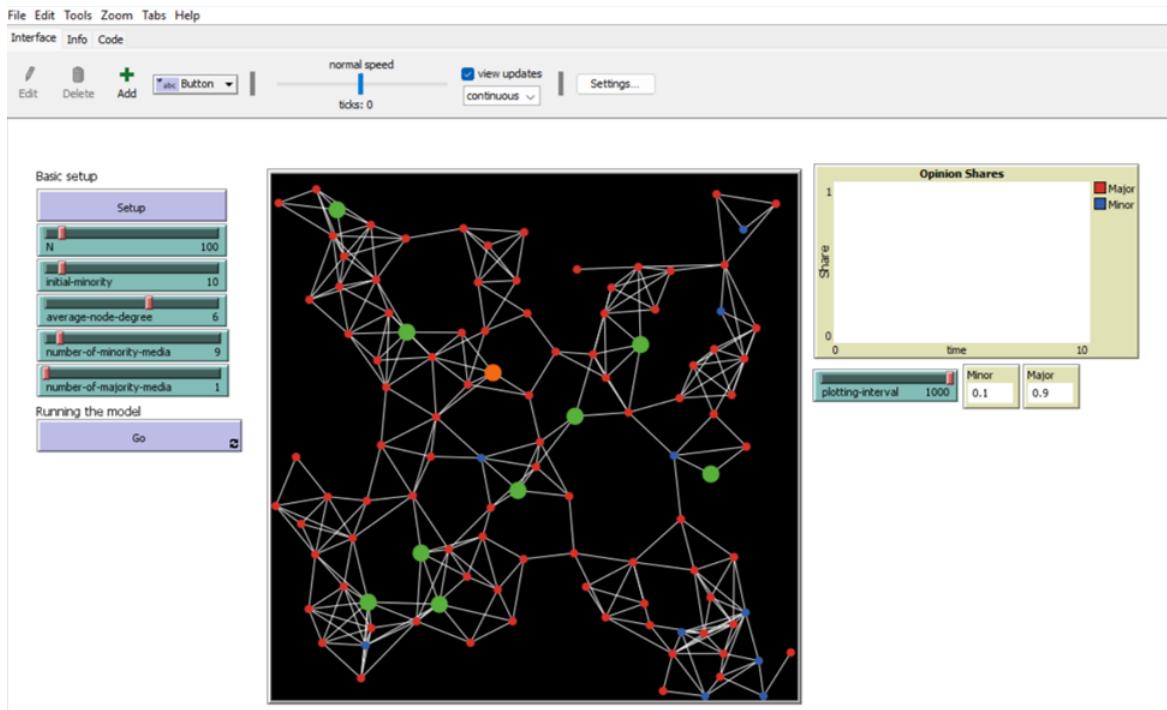
**Figure 3.2:** Implementation of the modified media effects model.

The media effects model depicts practical cases where an opinion is silenced, on a particular level of mass communication, unless there are individuals and media sources advocating for one opinion. An example discussed in this study is the 2022 Philippine national elections.

### 3.3 Gathering of Data

Two separate sets of 20 runs and 100 runs have been executed for the modified media effects model with varying values of AND, and differing ratios of media and non-media nodes. Note that the performed simulations only stop once the preference for either the minority, or the majority opinion becomes zero. The type of network used in this study has also been modified to spatial networks. Spatial networks have been previously studied by Narraido [21] in their paper since they have focused more on the effects of high connectivity in networks; as compared to the study by Alvarez-Galvez [1], which implemented preferential attachment networks.

#### 3.3.1 Legends for the Model in NetLogo



**Figure 3.3:** A sample of the generated network used for the simulations.

The legend for the simulation are as follows:

- a. The **minority** nodes are the **blue** circles. These represent individuals with a preference towards the perceived minority opinion of the group.

- b. The **majority** nodes are the **red** circles. These represent individuals with a preference towards the perceived majority opinion.
  - c. The **minority media** nodes are the larger, **green** circles. These represent mass media organizations, or individuals that can influence others on a certain level of mass communication, who have preferences towards the perceived minority opinion.
  - d. The **majority media** nodes are the larger, **orange** circles. These represent mass media systems, or individuals that can influence others on a certain level of mass communication, with preferences towards the perceived majority opinion.
  - e. The **links** between nodes are the **white** lines. These represent the connections between individuals where they can communicate.
- .

Using the parameters above, a set of media nodes, non-media nodes, and AND value has been determined from the results obtained, which provides the best combination that guarantees the success of minority opinion spreading within a highly connected network.

# Chapter 4

## Results and Discussion

From the previous chapter, Equation 3.1 dictates the ruling function of the model used for this study. This equation was used to define the stopping condition. Note that the simulations only stop when the preference for either opinion becomes zero. Based on the results obtained in this study, certain proportions of media and non-media nodes lead to the successful spreading of the minority opinion. In other words, the population's preference has shifted towards the minority opinion. The parameters that were modified in Equation 3.1 for the simulations of this study are represented as  $n_{j,i}$  for the non-media nodes with its preference  $p_j$  and  $m_{k,i}$  for the media nodes with its corresponding constant preference towards one opinion.

### 4.1 Effects of Media in a Highly Connected Network

The parameters that have been modified for this section are the non-media nodes, and the average node degree (AND) values. For the media nodes, the proportions of minority media nodes in this section have been fixed to 100%, 90%, 80%, 70%, 60%, 50%, 30%, and 10%. The corresponding complements of these percentages were then assigned as proportions of the majority media nodes. For each of these pair of percentages of media, the minority non-media nodes have also been given varying proportions of 10%, 20%, 30%, and 40%. The complements of these percentages were assigned to the majority non-media nodes. The structure of the network (i.e., high connectivity) has then been defined by the values of AND, which range from six to ten (6-10). Furthermore, two distinct sets of 20 runs and 100 runs have been performed for all combinations of parameters.

### 4.1.1 100% Minority Media Nodes: 10 minority only

To gauge the ability of the minority media to overturn the perceived majority opinion, a proportion of 100% minority media nodes was used for this set of simulations.

#### 10% Minority non-media nodes

Media Effects Model with 10% media nodes (MINORITY MEDIA ONLY)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	21 825	34 891
	7	22 007	22 500
	8	16 901	17 609
	9	13 851	14 974
	10	11 649	12 944

**Table 4.1:** (10 minority : 0 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.1, the best combination was given by the row with an AND value of 10, whose average number of ticks is 12 944 ticks after 100 runs. On the other hand, the worst combination for this proportion of minority non-media nodes is with an AND value of 6, which has provided an average time of 34 891 ticks after 100 runs.

### 20% Minority non-media nodes

Media Effects Model with 10% media nodes (MINORITY MEDIA ONLY)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	24 183	32 354
	7	14 488	23 040
	8	12 574	14 017
	9	11 227	12 288
	10	10 117	12 790

**Table 4.2:** (10 minority : 0 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

For this proportion of minority non-media nodes, the best combination is with an AND value of 9, which has an average time of 12 288 ticks after 100 runs. Also, the worst combination from Table 4.2 is with an AND value of 6, accompanied by an average of 32 354 ticks after 100 runs.

### 30% Minority non-media nodes

Media Effects Model with 10% media nodes (MINORITY MEDIA ONLY)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	16 844	32 049
	7	14 680	18 669
	8	12 332	12 142
	9	10 696	9 665
	10	7 708	9 075

**Table 4.3:** (10 minority : 0 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

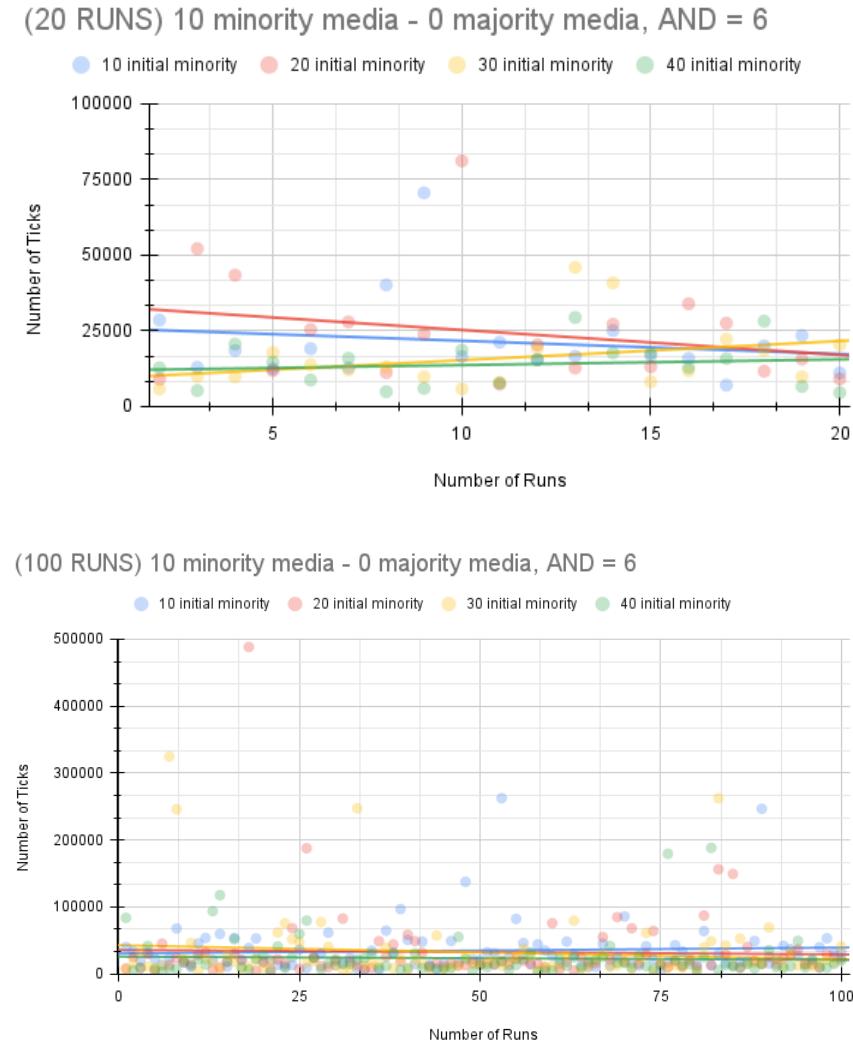
This proportion of minority non-media nodes has the least average time of 9 075 ticks after 100 runs, with an AND value of 10. Also, the worst combination for Table 4.3 is with an AND value of 6, which gave an average time value of 32 049 ticks after 100 runs.

### 40% Minority non-media nodes

Media Effects Model with 10% media nodes (MINORITY MEDIA ONLY)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	13 531	23 280
	7	11 786	13 236
	8	10 270	13 474
	9	9 612	9 443
	10	9 497	7 435

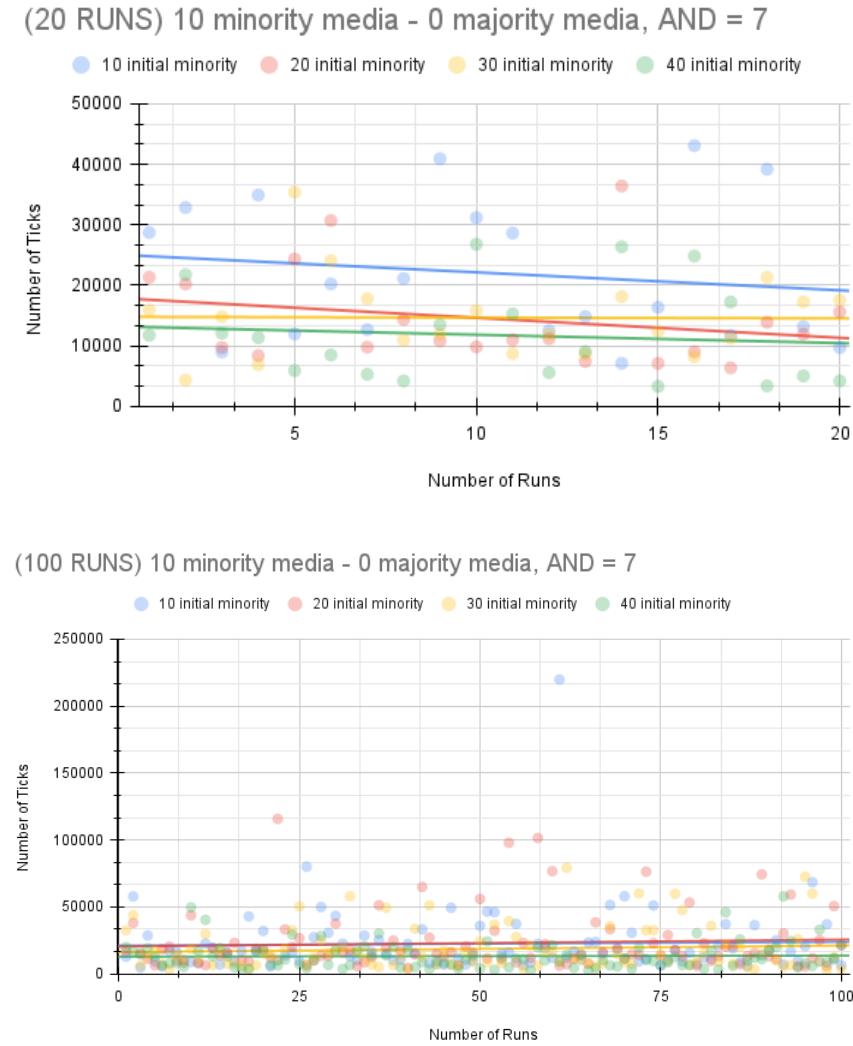
**Table 4.4:** (10 minority : 0 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

In Table 4.4, the best combination for this proportion of minority non-media nodes is with an AND value of 10, which provided the least average number of 7 435 ticks after 100 runs. Furthermore, the worst combination was given by a value of 6 AND, with an average of 23 280 ticks after 100 runs.



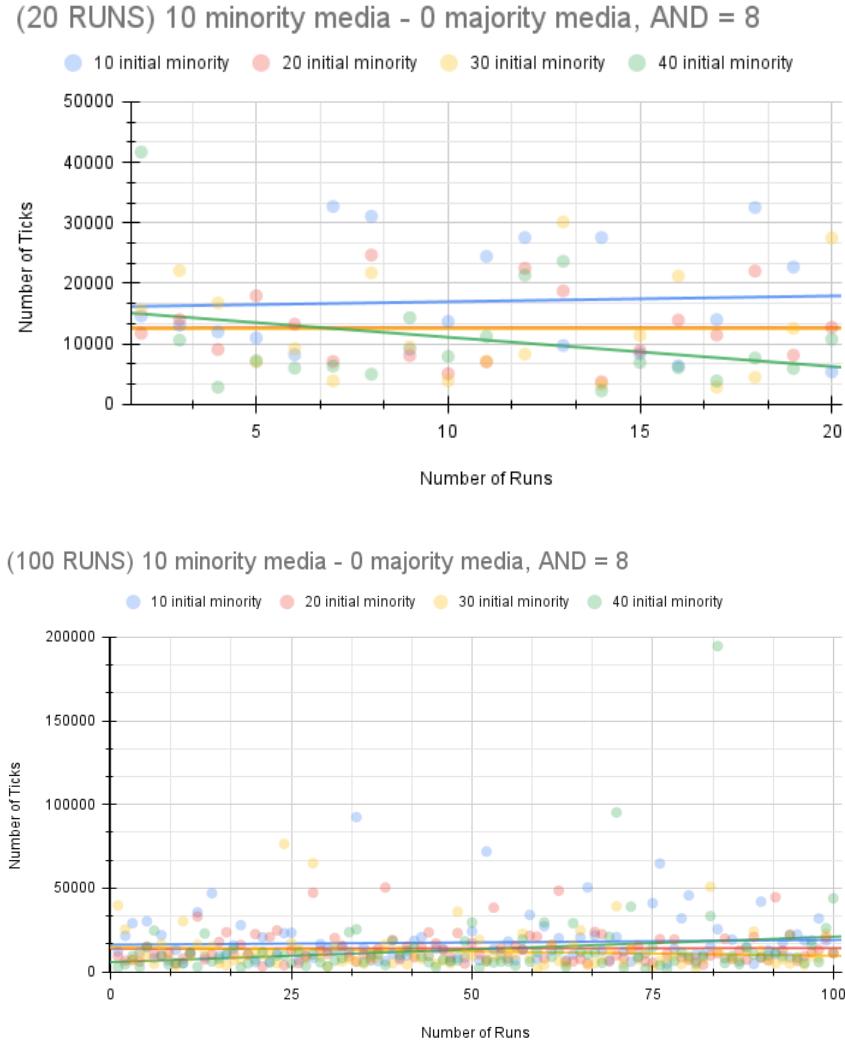
**Figure 4.1:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 6 and a ratio of 10 minority : 0 majority media nodes.

From Figure 4.1, the trend formed by the data points from the set of 20 runs has decreased by 37.1% and 182% for the blue and the red trends, respectively; and increased by 202% and 181% for the yellow and the green trends, respectively. On the other hand, the trends formed by the data points with initial values of 20, 30, and 40 minority non-media nodes (from the set of 100 runs) have decreased by 21.9% (red), 11.7% (yellow), and 21.5% (green), respectively, while the blue trend has an increase of 12.3%.



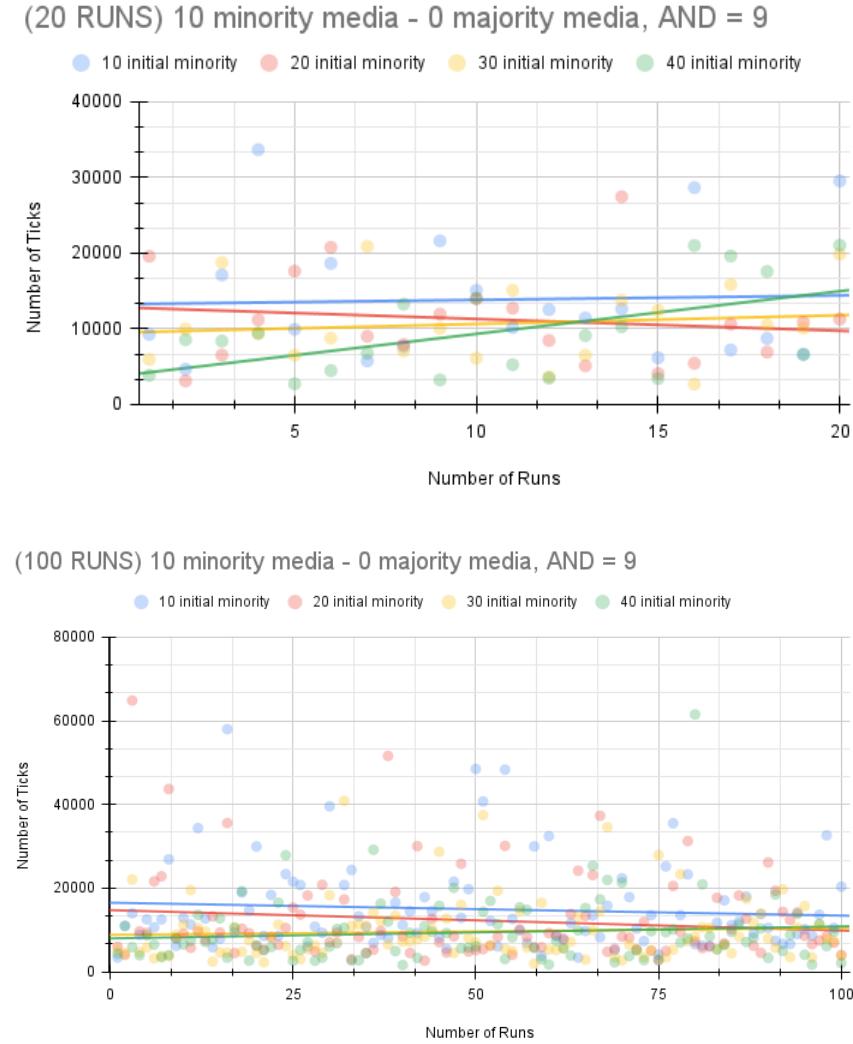
**Figure 4.2:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 7 and a ratio of 10 minority : 0 majority media nodes.

From Figure 4.2, three of the four trends in the set of 20 runs has decreased by 70.7% (blue), 39% (red), and 240% (green). Only the trend formed by the data points with an initial value of 30 minority non-media nodes had increased by 394%. For the set of 100 runs, all trends have increased by 9.48% (blue), 27.2% (red), 18% (yellow) and 25.8% (green).



**Figure 4.3:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 8 and a ratio of 10 minority : 0 majority media nodes.

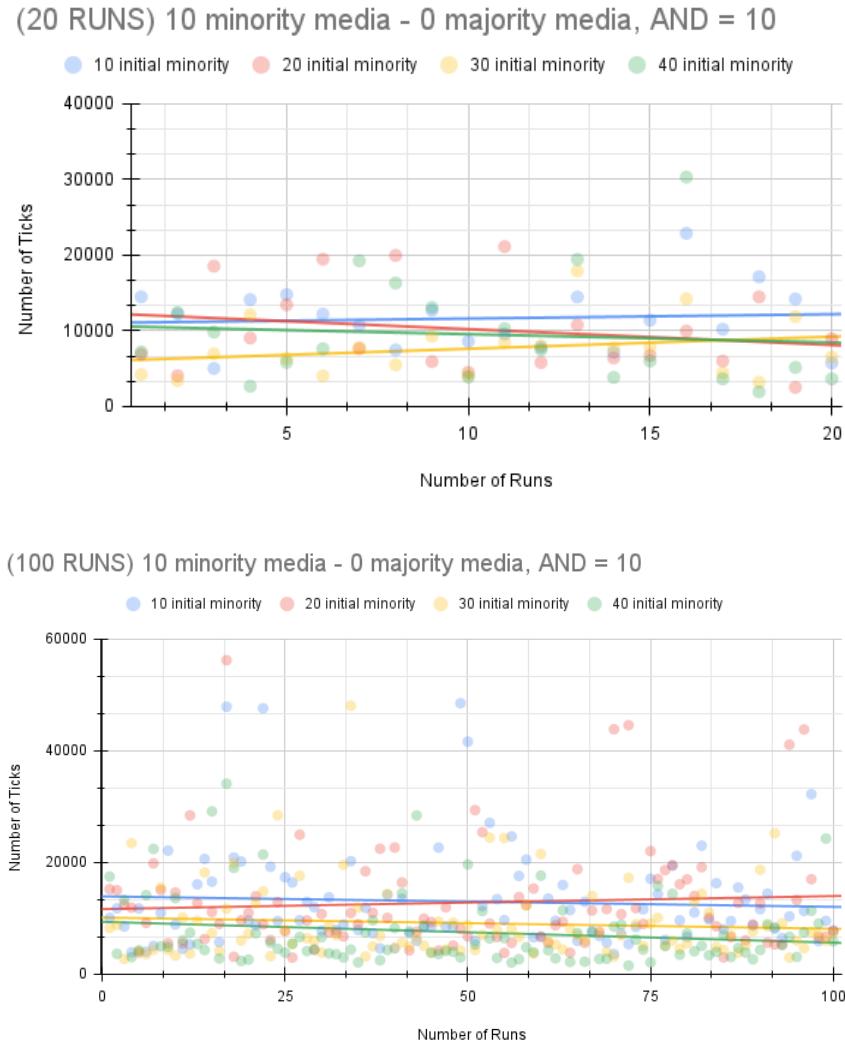
In Figure 4.3, the set of 20 runs has three of its trends to have increased by approximate values of 368% (blue), 2.12% (red), and 281% (yellow). The trend formed by the data points with an initial value of 40 minority non-media nodes was the only one to have a decreasing trend of 71.3%. On the other hand, in the set of 100 runs, the same number of trends (blue, red, and green) have increased by 3.8%, 3.44%, and 19.7%, respectively. The data points with an initial value of 30 minority non-media nodes had a decreasing trend of 1.53%.



**Figure 4.4:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 9 and a ratio of 10 minority : 0 majority media nodes.

The set of 20 runs from Figure 4.4 has three of its four trends to have increased by 80.5% for the blue trend, 64.9% for the yellow trend, and 130% for the green trend. The data points with an initial value of 20 minority non-media nodes, on the other hand, has a decreasing trend of 121%. In the set of 100 runs, the data points with initial values of 10 and 20 minority non-media nodes have decreasing trends of 17.8% and 25.4%, respectively. Meanwhile, the data points with initial values of 30 and 40 minority non-media nodes have increased by 16% for the yellow trend, and 19.9% for the

green trend.



**Figure 4.5:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 10 and a ratio of 10 minority : 0 majority media nodes.

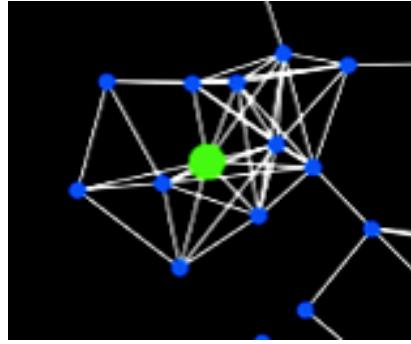
From the set of 20 runs from Figure 4.5, half of the trends have increased by 1.55% for the blue trend, and 10.5% for the yellow trend. The other half of the trends have decreasing trends of 2.24% for the red trend, and 3.94% for the green trend. On the set of 100 runs, the red trend has increased by 13.1%. While the data points with initial values

of 10, 30, and 40 minority non-media nodes have decreasing trends of 12.6%, 37.6%, and 13.1%, respectively.

From Table 4.3, the overall best combination (i.e., the minority wins) in the set of 20 runs has an initial ratio of non-media nodes 30 minority : 70 majority with an AND of 10; which provided the smallest average number of ticks (7 708 ticks) in the set. However, in the set of 100 runs, the overall best combination has switched to the executions with an initial ratio of 40 minority : 60 majority non-media nodes, still with an AND value of 10 (7 435 ticks), from Table 4.4.

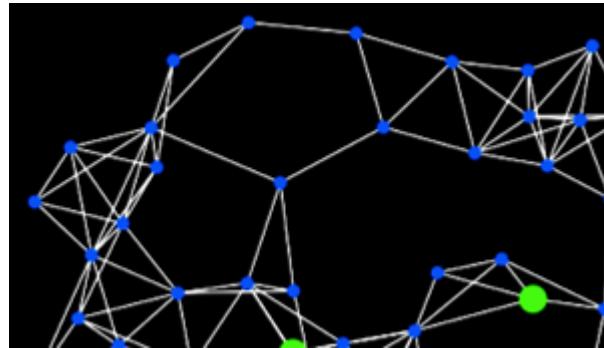
The overall worst combinations were also different for the two sets of executions, where the minority opinion took longer to overcome the perceived majority opinion in the network. For the set with 20 runs, the overall worst combination, from Table 4.2, has an initial ratio of 20 minority : 80 majority non-media nodes and an AND value of 6 (24 183 ticks); while in the set with 100 runs, the overall worst combination, from Table 4.1, has an initial ratio of 10 minority : 90 majority non-media nodes with an AND value of 6 (32 354 ticks). These combinations provided the longest average time values since these had higher frequencies of larger numbers of ticks acquired from the executed simulations.

During the simulations, an observable feature for faster dissemination of minority opinion was when the minority media nodes have a higher number of links compared to the other nodes (see Figure 4.6). This made it easier for the minority media nodes to influence more majority non-media nodes into switching preferences. Another attribute was when these minority media nodes were closely linked with other minority non-media nodes. This gave the minority opinion a higher chance of survival in the network.



**Figure 4.6:** An area of the network where the minority media node has a high number of links.

Another noticeable trait was when a specific area of the network did not have nearby minority media nodes, then the minority opinion had difficulty moving across that area. Moreover, when there were no minority media nodes present within reach of these minority non-media nodes, then the chances of survival for the minority opinion have become lesser in these areas. This means that the minority non-media nodes have become vulnerable to switching preferences as influenced by the surrounding majority non-media nodes. Additionally, these areas were mainly composed of nodes with lower connections, as seen in Figure 4.7.



**Figure 4.7:** An area of the network where the minority non-media nodes have a lower number of links.

Theoretically, this ratio of pure minority media nodes was one of the more optimal solutions for the minority opinion to successfully spread across a network, as discussed by both Alvarez-Galvez [1] and Narraido [21]. Practically speaking, minority media are not

the only ones existing in society. There are also majority media which often dominates the opinion dynamics in urbanized areas, sometimes even in rural neighborhoods.

#### 4.1.2 90% Minority Media Nodes: 9 minority - 1 majority

Next, more sets of 20 and 100 runs were executed for each pair of a proportion of minority non-media nodes and a value of AND. For this subsection, the proportion of minority media has been adjusted to 90% of the total number of media nodes.

##### 10% Minority non-media nodes

Media Effects Model with 10% media nodes (9 minority : 1 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	55 688	72 095
	7	36 712	47 600
	8	23 154	39 370
	9	15 885	20 720
	10	12 070	18 586

**Table 4.5:** (9 minority : 1 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.5, the best combination for this proportion of minority non-media nodes was given by a value of 10 AND, with an average time of 18 586 ticks after 100 runs. Furthermore, the row with an AND value of 6 has provided the worst combination for this set, with an average number of 72 095 ticks after 100 runs.

### 20% Minority non-media nodes

Media Effects Model with 10% media nodes (9 minority : 1 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	59 602	62 262
	7	37 502	41 150
	8	25 300	66 483
	9	18 041	23 068
	10	14 758	17 603

**Table 4.6:** (9 minority : 1 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

For this proportion of minority non-media nodes, the best combination is with an AND value of 10, from Table 4.6; which provided an average number of 17 603 ticks after 100 runs. Additionally, the row with an AND value of 6 gave the least favorable average time value of 62 262 ticks after 100 runs.

### 30% Minority non-media nodes

Media Effects Model with 10% media nodes (9 minority : 1 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	53 297	44 386
	7	30 931	30 311
	8	17 739	35 725
	9	17 627	21 520
	10	16 769	17 690

**Table 4.7:** (9 minority : 1 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

From Table 4.7, the best combination was given by a value of 10 AND, with an average number of 17 690 ticks after 100 runs of the simulation. Furthermore, the row with an AND value of 6 has provided the worst time value of 44 386 ticks for this set of 100 runs.

### 40% Minority non-media nodes

Media Effects Model with 10% media nodes (9 minority : 1 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	43 600	42 259
	7	25 381	26 447
	8	17 516	25 340
	9	16 443	19 979
	10	15 852	14 795

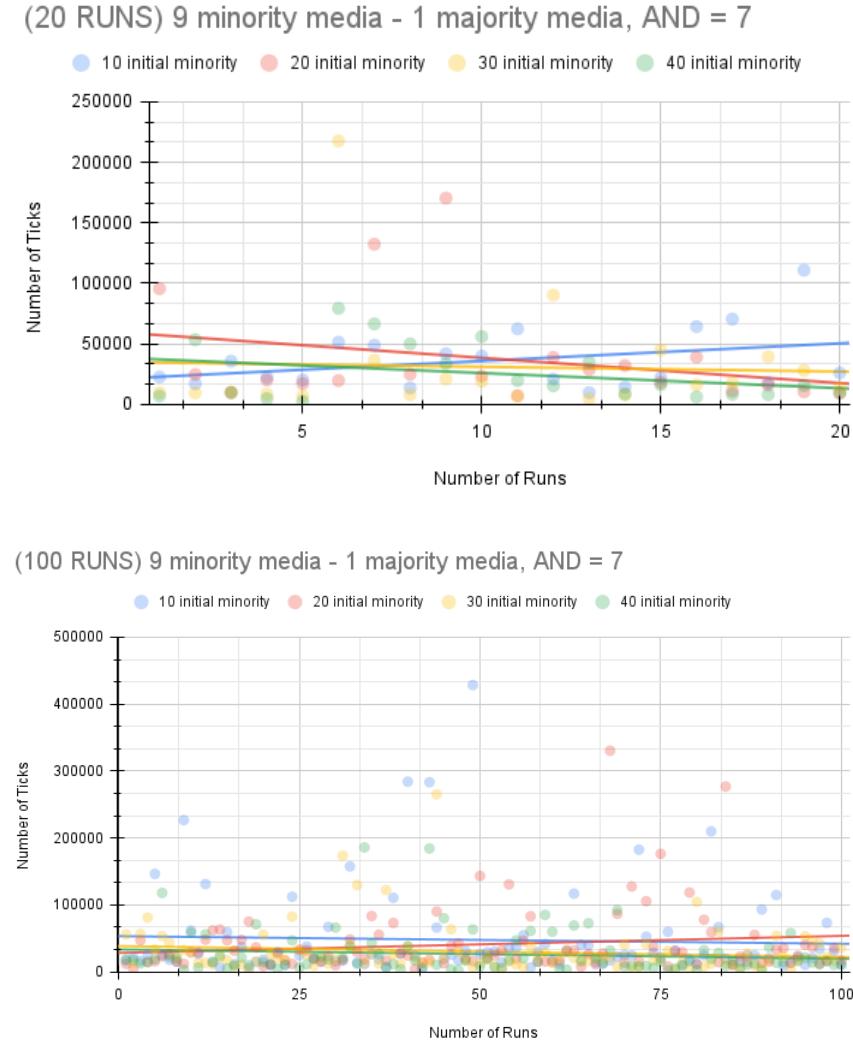
**Table 4.8:** (9 minority : 1 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

Similarly in Table 4.8, the row with an AND value of 10 has provided the best combination for this set of non-media nodes, with an average of 14 795 ticks after 100 runs. Moreover, the worst combination was given by a value of 6 AND, with an average time of 42 259 ticks in the set of 100 runs.



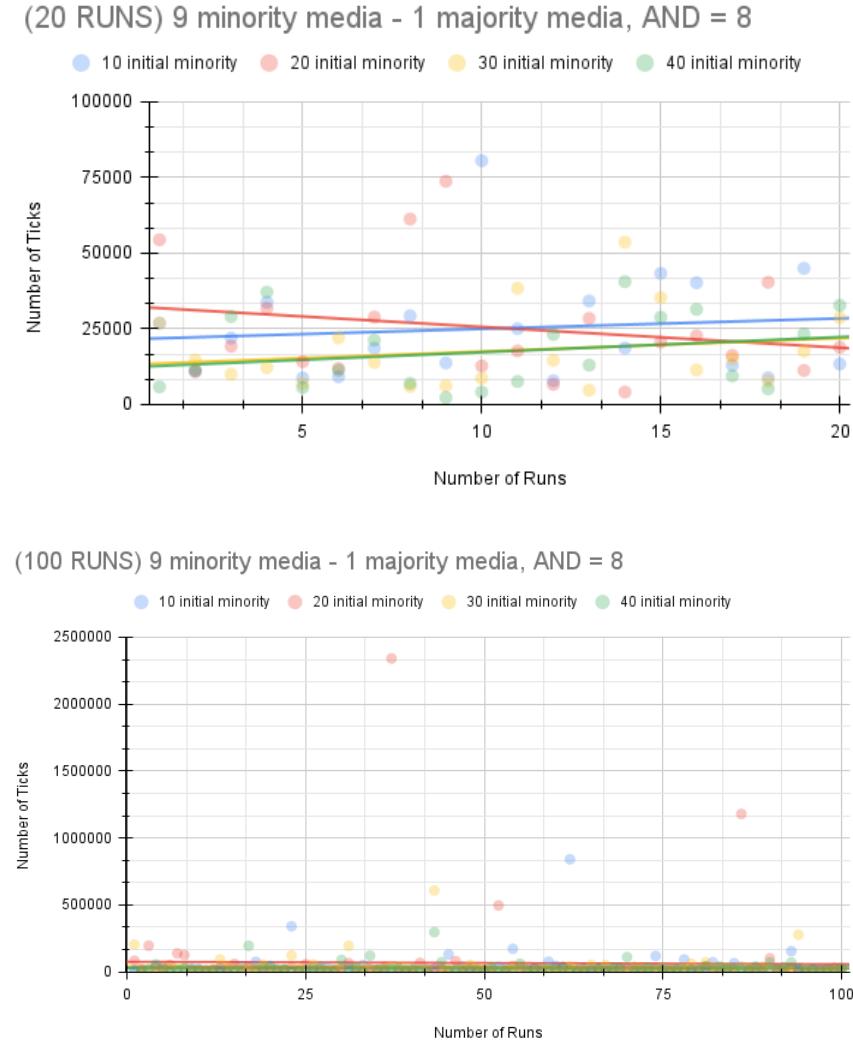
**Figure 4.8:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 6 and a ratio of 9 minority : 1 majority media nodes.

From the data points of the set of 20 runs in Figure 4.8, three of these trends have decreased by 173% (blue), 90.2% (red), and 142% (green). Moreover, the yellow trend has an increase of 262%. Similarly, the first half of the trends in the set of 100 runs have increased by 17.5% (blue) and 12.7% (red). While the latter half of the trends have decreased by 1.43% (yellow) and 15.1% (green).



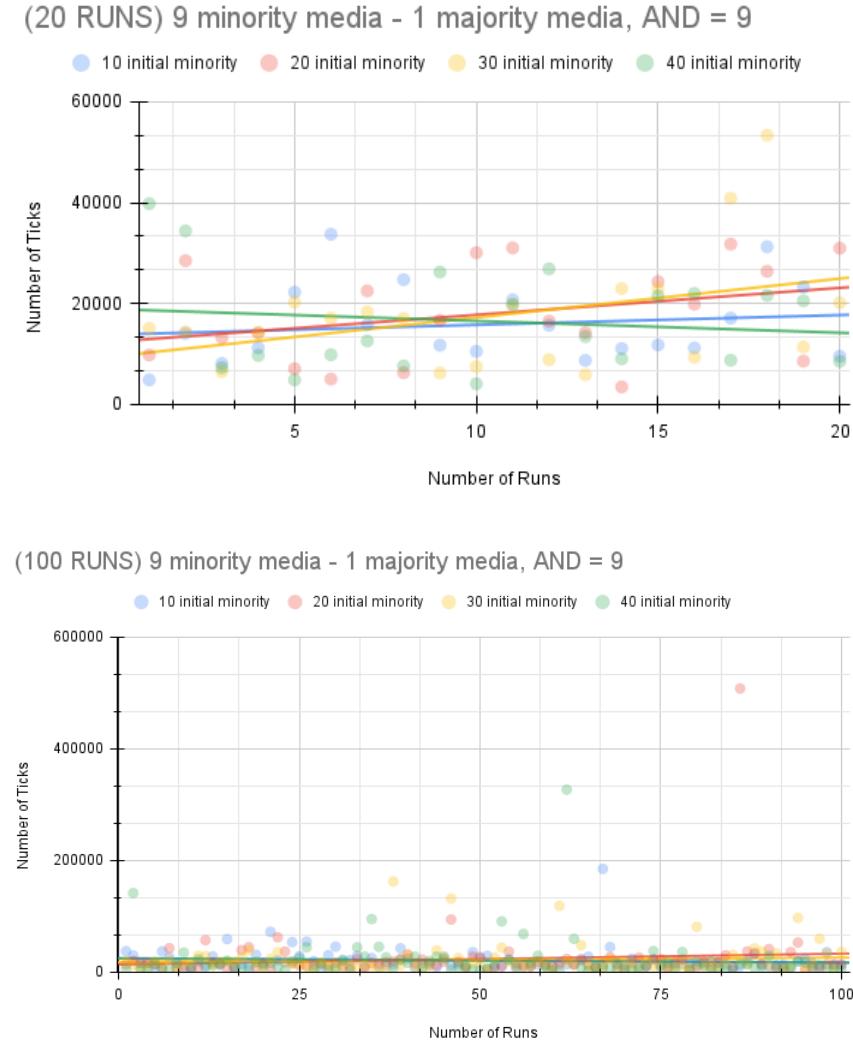
**Figure 4.9:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 7 and a ratio of 9 minority : 1 majority media nodes.

Three of the four trends in the set of 20 runs, shown in Figure 4.9, have decreasing trends of 294% (red), 136% (yellow), and 394% (green). Only the data points with an initial value of 10 minority non-media nodes had an approximate of 346% increase in its trend. In the set of 100 runs, three of the four trends have decreased by 29.3% for the blue trend, 17.3% for the yellow trend, and 27.6% for the green trend. Only the red trend had an approximate increase of 46.1%.



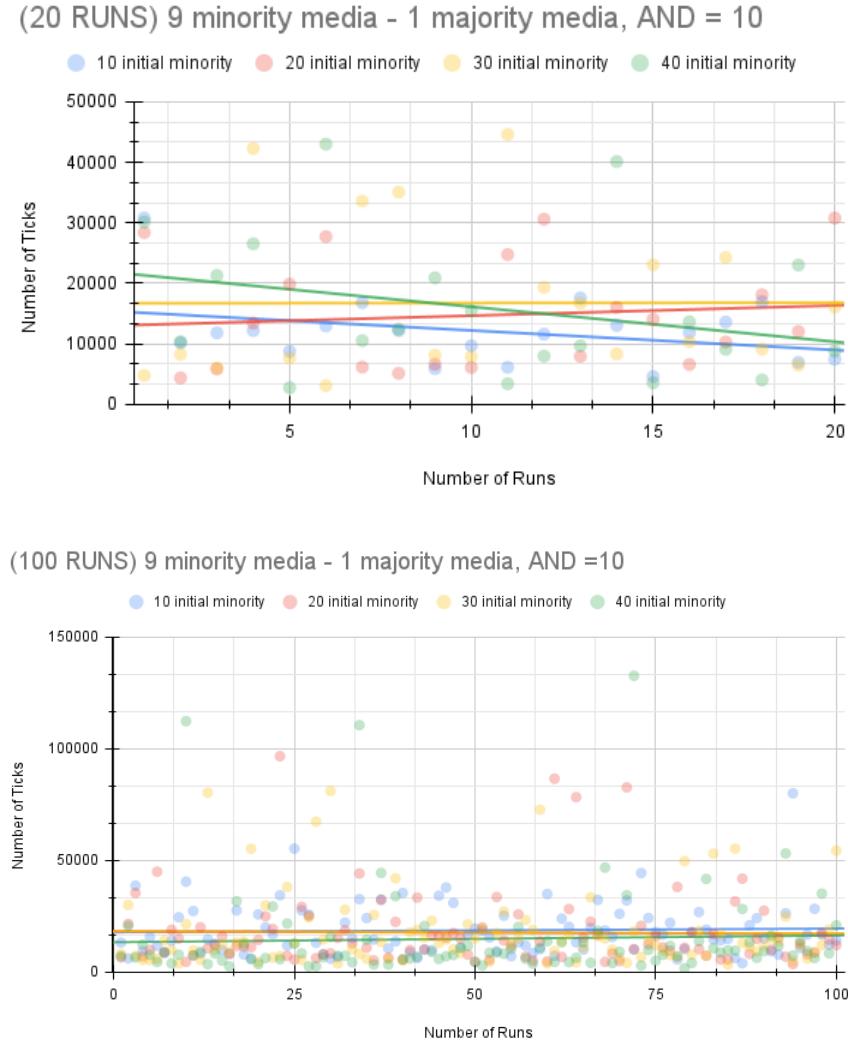
**Figure 4.10:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 8 and a ratio of 9 minority : 1 majority media nodes.

In Figure 4.10, the set of 20 runs has three of its four trends having 142%, 152%, and 71.6% increases for the blue, the yellow, and the green trends, respectively, while the remaining red trend had an approximate decrease of 46%. Proceeding to the set of 100 runs, half of the trends have increasing trends of 42.9% (blue) and 12.7% (green). On the other hand, the remaining two trends have decreased by 8.5% (red), and 7.99% (yellow).



**Figure 4.11:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 9 and a ratio of 9 minority : 1 majority media nodes.

From Figure 4.11, three of the four trends in the set of 20 runs have increasing trends of 140% for the blue trend, 40.2% for the red trend, and 297% for the yellow trend; while the trend formed by the data points with an initial value of 40 minority non-media nodes has a decreasing trend of 36.4%. Meanwhile, in the set of 100 runs, half of the trends have decreased by 36.5% for the blue trend, and 32.5% for the green trend. The two remaining trends have increased by 20.5% and 58.8% for the red and yellow trends, respectively.



**Figure 4.12:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 10 and a ratio of 9 minority : 1 majority media nodes.

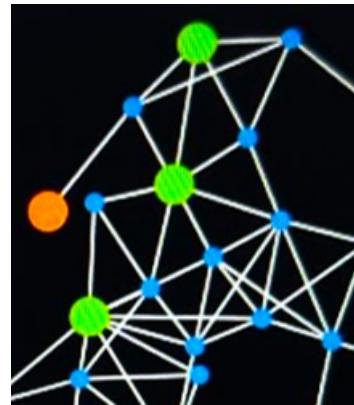
Half of the trends in the set of 20 runs from Figure 4.12 have decreasing trends. Particularly, the blue and the green trends have decreased by 119% and 222%, respectively. The remaining trends, red and yellow, have increased by 62.8% and 131%, respectively. Likewise, on the set of 100 runs, half of the trends, namely the blue and the green trends, have increased by 11% and 7.43%, respectively. The other half of the trends, red and yellow, have corresponding increasing trends of 833% and 21.3%.

The overall best combination for the set with 20 runs of the model can be found

in Table 4.5 having a ratio of 10 : 90 non-media nodes, and an AND value of 10. This pair has given the shortest time of spreading with 12 070 ticks, which was the fastest dissemination of minority opinion for this set. For the set with 100 runs of the model, the overall best combination has shifted, as seen in Table 4.8, to the executions with an initial ratio of 40 minority : 60 majority non-media nodes, and an AND value of 10. This combination has provided the shortest average time of 14 795 ticks.

The overall worst combination for the set of 20 runs was provided by the pair of initial ratio of 20 minority : 80 majority non-media nodes, and an AND value of 6 (59 602 ticks), as shown in Table 4.6. While the overall worst combination for the set of 100 runs was given by the pair with an initial ratio of 10 minority : 90 majority non-media nodes, and an AND value of 6 (72 095), from Table 4.5. These pairs have given the worst combinations since these had higher frequencies of larger values of ticks acquired from the simulations.

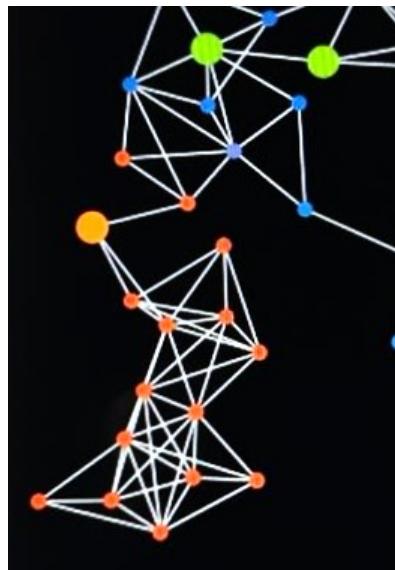
In this proportion of minority media nodes, the minority opinion has won when the majority media node has a lower degree than the minority media nodes surrounding it. Moreover, when the minority media nodes completely circled the majority media node, then there is a higher chance for the minority opinion to succeed, as seen in Figure 4.13.



**Figure 4.13:** An area of the network where the minority media nodes surround a majority media node.

There were also times when the minority opinion had difficulty moving across a section of the network. This happened when this area had less than three links attached

to the overall network. Furthermore, if one of the nodes connecting this area to the main network was a majority media node, then the minority opinion would have taken longer than usual to spread through that area. An even worse case was when there was only one link connecting the area to the main network, and the connecting node was a majority media node, then it would have been impossible for the minority opinion to infiltrate that area (see Figure 4.14).



**Figure 4.14:** An area of the network where a majority media node connects an isolated section of the network to the main network.

To summarize, the success of minority opinion generally relied on (1) high counts of links for its minority media nodes, (2) minority media nodes enclosing majority media nodes in the network, and (3) the presence of minority non-media nodes within close range of its minority media nodes, preferably when these non-media nodes were directly connected to the media nodes. As of now, the minority opinion won with the smallest average number of ticks that can be considered as the fastest time for the minority opinion to succeed among all the other percentages of media nodes.

### 4.1.3 80% Minority Media Nodes: 8 minority - 2 majority

More sets of 20 and 100 runs were performed for each pair of proportion of minority non-media nodes and value of AND. For this subsection, the proportion of minority media has been decreased to 80% of the total number of media nodes.

#### 10% Minority non-media nodes

Media Effects Model with 10% media nodes (8 minority : 2 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	158 542	187 517
	7	78 896	144 950
	8	77 809	75 298
	9	27 326	53 813
	10	25 165	34 240

**Table 4.9:** (8 minority : 2 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.9, the best combination for this proportion of minority non-media nodes was given by a value of 10 AND, with an average number of 34 240 ticks after 100 runs. Also, the row with an AND value of 6 has provided the worst combination for this proportion of minority non-media nodes, with an average of 187 517 ticks in the set of 100 runs.

### 20% Minority non-media nodes

Media Effects Model with 10% media nodes (8 minority : 2 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	278 425	191 372
	7	93 328	107 517
	8	60 472	90 891
	9	38 900	39 316
	10	25 011	25 166

**Table 4.10:** (8 minority : 2 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

In Table 4.10, an AND value of 10 has provided the best combination for this proportion of minority non-media nodes, with an average time of 25 166 ticks in the set of 100 runs. Moreover, the worst combination was given by the row with an AND value of 6, which has an average time value of 191 372 ticks after 100 runs of the simulation.

### 30% Minority non-media nodes

Media Effects Model with 10% media nodes (8 minority : 2 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	100 628	196 385
	7	71 695	121 800
	8	38 295	222 808
	9	19 662	33 195
	10	49 497	37 361

**Table 4.11:** (8 minority : 2 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

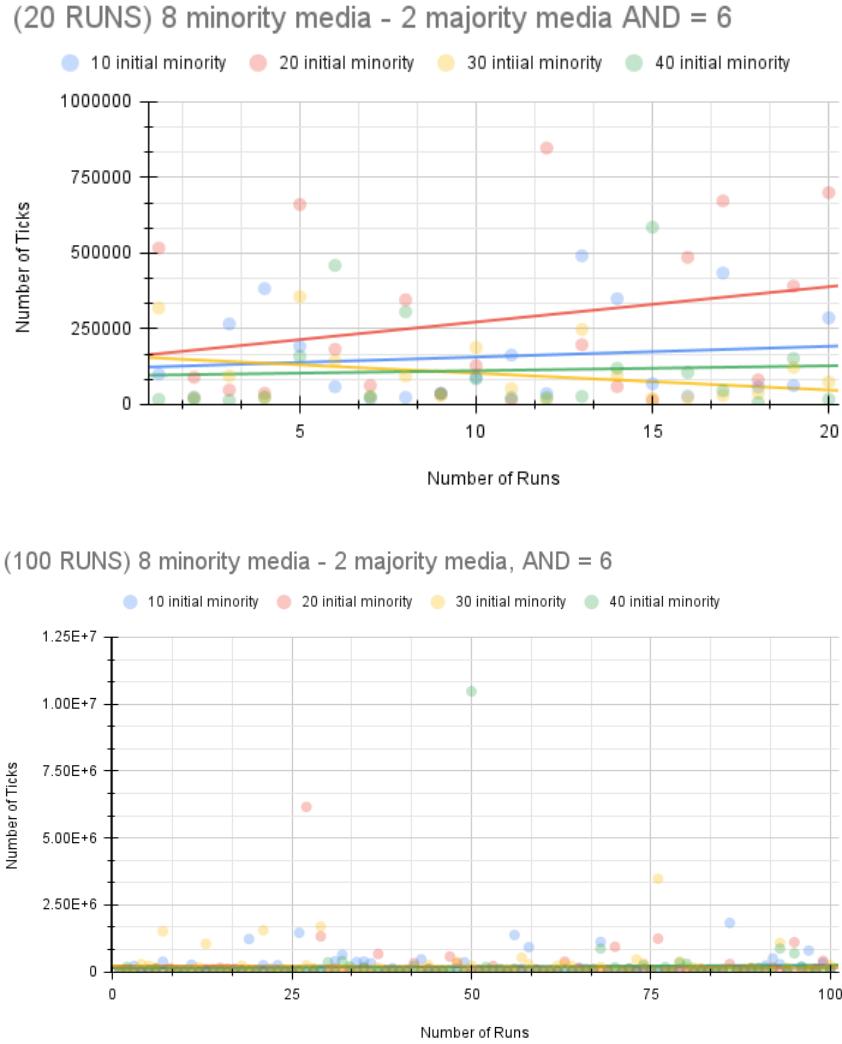
From Table 4.11, the best combination for this proportion of minority non-media nodes was with an AND value of 9, which has provided an average time of 33 195 ticks after 100 runs. Moreover, the combination with an AND value of 8 has provided the worst combination for this set of non-media nodes, with an average of 222 808 ticks in the set of 100 runs.

### 40% Minority non-media nodes

Media Effects Model with 10% media nodes (8 minority : 2 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	112 569	195 901
	7	80 325	55 942
	8	63 039	52 918
	9	59 838	79 607
	10	14 894	32 221

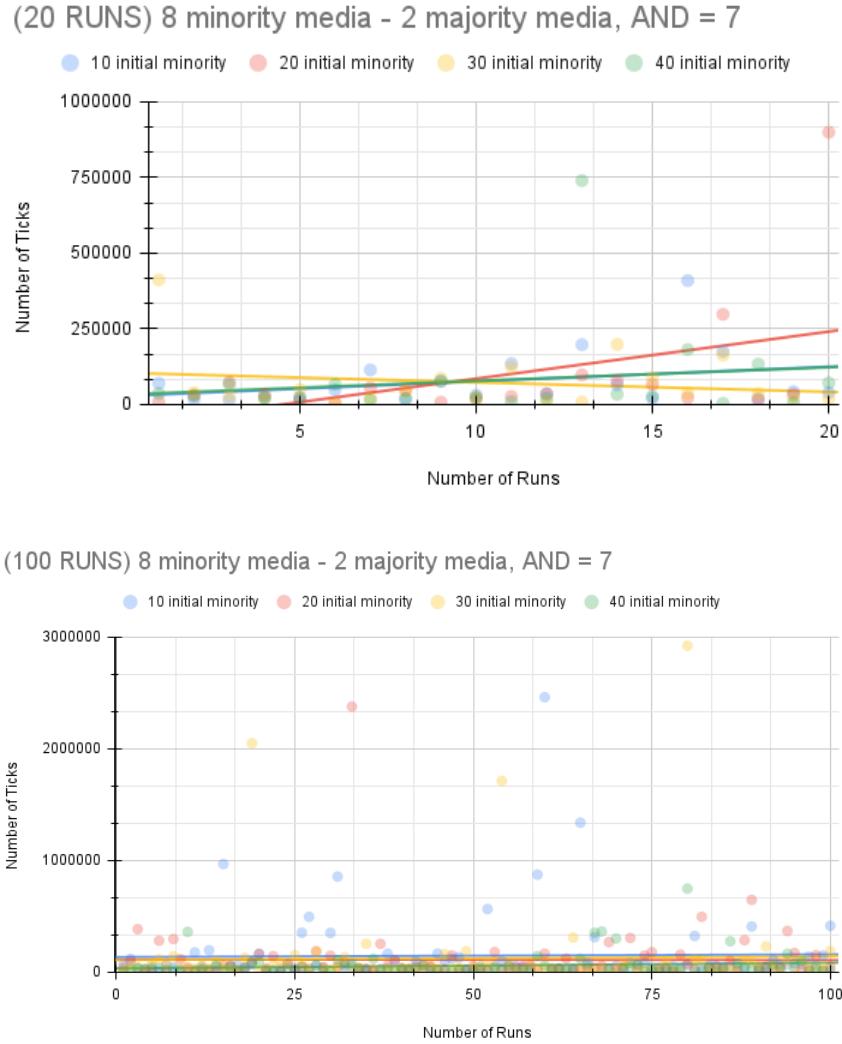
**Table 4.12:** (8 minority : 2 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

In Table 4.12, the best combination was given by a value of 10 AND, with an average time of 32 221 ticks after 100 runs. Similarly, the row with an AND value of 6 has the worst combination for this set of non-media nodes, with an average of 195 901 ticks after 100 runs.



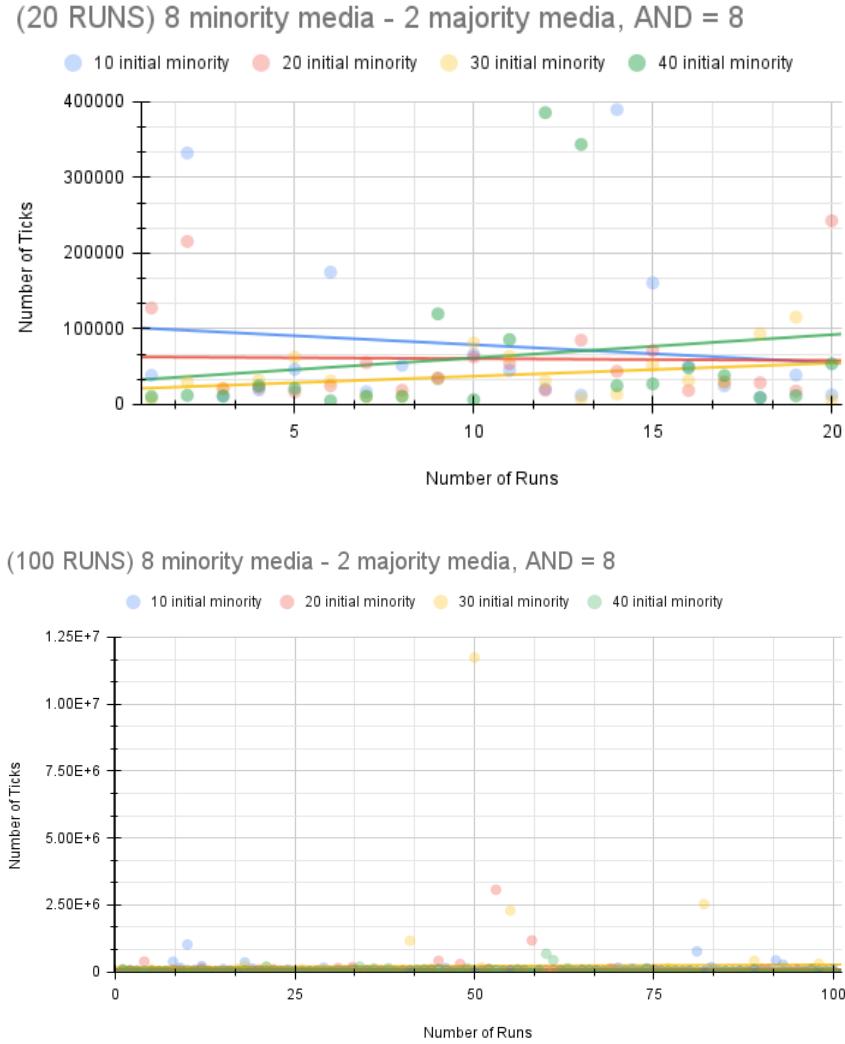
**Figure 4.15:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 6 and a ratio of 8 minority : 2 majority media nodes.

Three of the trends in the set of 20 runs, from Figure 4.15, have increased by 113% (blue), 39.5% (red), and 411% (green); as opposed to the trend formed by the data points with an initial value of 30 minority non-media nodes, which has a decrease of nearly 575%. Meanwhile, for the set of 100 runs, three of the four trends have increased by 5.15% (blue), 8.74% (yellow), and 6.22% (green). Only the red trend has an increase of 50.5%.



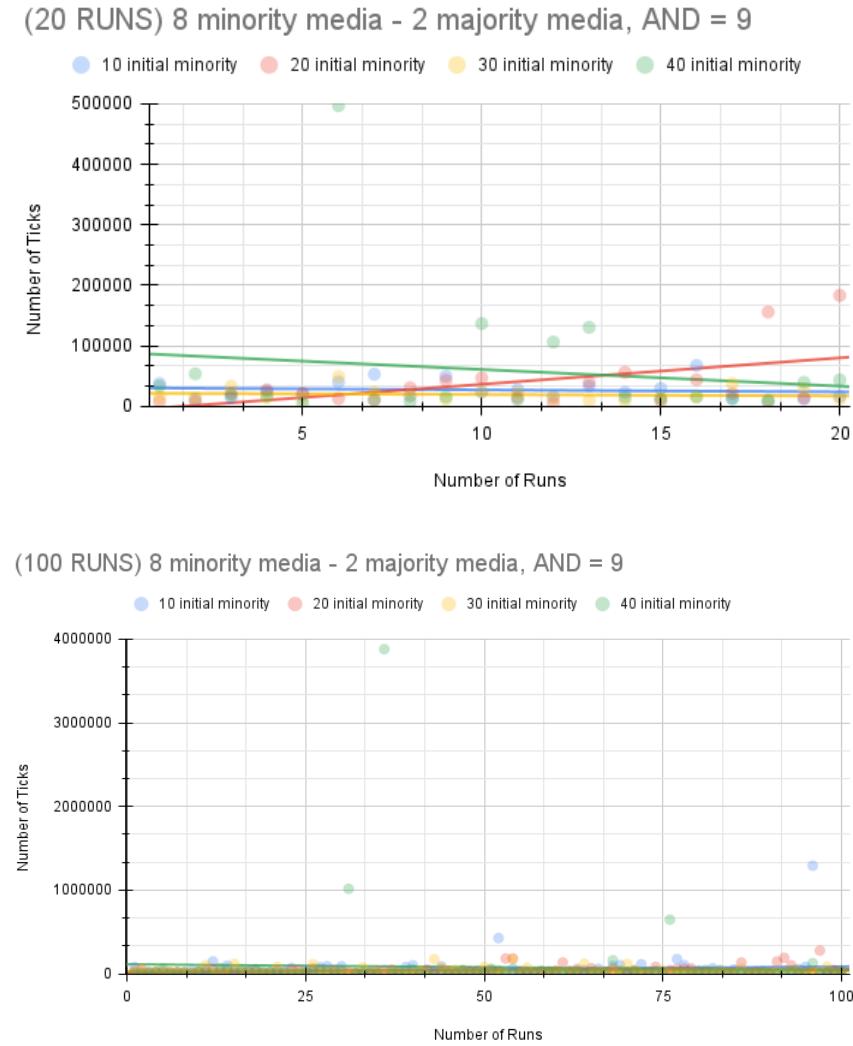
**Figure 4.16:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 7 and a ratio of 8 minority : 2 majority media nodes.

In the set of 20 runs from Figure 4.16, three of the four trends formed by the data points with initial values of 10, 20, and 40 minority non-media nodes have increased by 237%, 222%, and 766%, respectively; with the exception of the yellow trend created by the data points with an initial value of 30 minority non-media nodes, which had a decreasing trend of 129%. On the set of 100 runs, three of the four trends have increased by 18.3% (blue), 8.31% (yellow), and 30.6% (green). Only the red trend had a decreasing trend of 0.0095%.



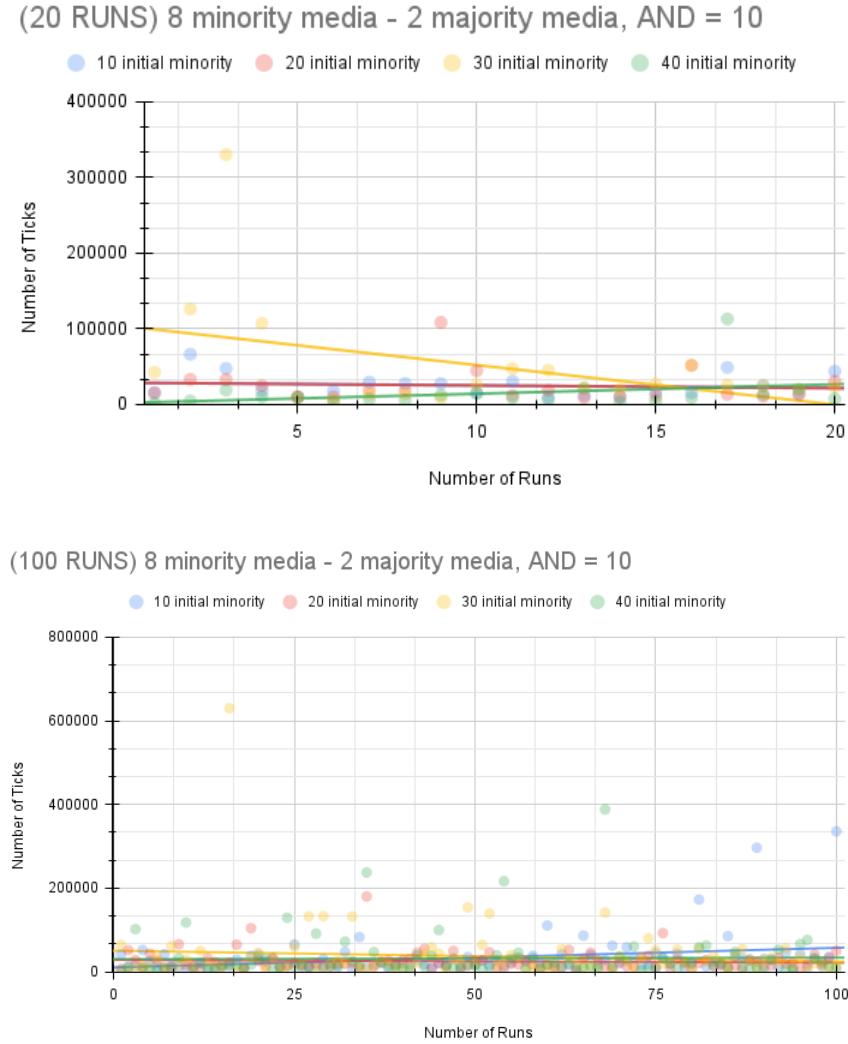
**Figure 4.17:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 8 and a ratio of 8 minority : 2 majority media nodes.

In Figure 4.17, the first half of the trends in the set of 20 runs have decreasing trends of 180% (blue) and 106% (red). Also, the latter half of the trends have increased by 120% (yellow) and 201% (green). Similarly for the set of 100 runs, the first half of the trends have decreasing trends of 2.53% for the blue trend and 31.3% for the red trend; while the latter half have increased by 14% (yellow), and 13.4% (green).



**Figure 4.18:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 9 and a ratio of 8 minority : 2 majority media nodes.

From the set of 20 runs in Figure 4.18, the blue, yellow, and green trends have decreased by 3.61%, 148%, and 328%, respectively. Additionally, the red trend has increased by 741%. In the set of 100 runs, three of the four trends have increasing trends of 0.157% for the blue trend, 26.7% for the red trend, and 20.9% for the yellow trend. The remaining green trend has a decrease of 5.97%.



**Figure 4.19:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 10 and a ratio of 8 minority : 2 majority media nodes.

In the set of 20 runs from Figure 4.19, the blue, red, and yellow trends have decreased by 20.2%, 112%, and 487%, respectively. The remaining green trend has an increasing trend of 210%. Next, the set of 100 runs has half of its trends increased by 43.8% for the blue trend, and 8.02% for the green trend. The remaining half of the trends have decreasing trends of 5.01% for the red trend, and 16% for the yellow trend.

From Table 4.12, the overall best combination for the set of 20 runs was with an initial ratio of 40 minority : 60 majority non-media nodes, along with an AND value of

10. The average time given by this combination is 14 894 ticks. The shortest average time provided by an initial value of 20 minority non-media nodes in the set of 100 runs, from Table 4.10, was given by an AND value of 10, which has provided an average time of 25 166 ticks.

For the set of 20 runs, the overall worst combination, from Table 4.10, was given by the pair with an initial ratio of 20 minority : 80 majority non-media nodes, and an AND value of 6 (278 425 ticks). While the set of 100 runs, from Table 4.11, has an overall worst combination provided by the pair with an initial ratio of 30 minority : 70 majority non-media nodes, and an AND value of 6 (196 385 ticks).

As previously described, the best combinations for each set of 20 and 100 runs have encountered similar conditions as the preceding favorable combinations where (1) the minority media nodes have enclosed the majority media nodes throughout most of the executed simulations, (2) the minority media nodes were also assigned higher numbers of links compared to the majority media nodes in the network, and (3) the minority non-media nodes were connected with the minority media nodes, which guaranteed the continuity of the minority opinion. Likewise, all these features guaranteed the success of the minority opinion for this proportion of minority media nodes.

#### 4.1.4 70% Minority Media Nodes: 7 minority - 3 majority

More sets of 20 and 100 runs for each pair of proportion of minority non-media nodes and AND were executed for this proportion of media nodes. The proportion of minority media has been decreased to 70% of the total number of media nodes for these simulations.

### 10% Minority non-media nodes

Media Effects Model with 10% media nodes (7 minority : 3 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	365 103	1 225 738
	7	160 758	849 982
	8	71 620	292 565
	9	132 479	293 397
	10	82 556	144 444

**Table 4.13:** (7 minority : 3 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

The best combination for this proportion of minority non-media nodes was given by a value of 10 AND, with an average time of 144 444 ticks after 100 runs. Moreover, the worst combination for this set was from the row with an AND value of 6, which has provided an average number of 1 225 738 ticks after 100 runs.

### 20% Minority non-media nodes

Media Effects Model with 10% media nodes (7 minority : 3 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	494 182	1 281 531
	7	384 893	998 476
	8	165 285	196 796
	9	88 618	174 265
	10	46 479	212 897

**Table 4.14:** (7 minority : 3 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

For Table 4.14, the best combination for this proportion of minority non-media nodes was given by a value of 9 AND, which has provided an average time of 174 265 ticks after 100 runs. Moreover, the worst combination has provided an average number of 1 281 531 ticks after 100 runs, which had an AND value of 6.

### 30% Minority non-media nodes

Media Effects Model with 10% media nodes (7 minority : 3 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	446 623	657 479
	7	177 883	357 416
	8	148 773	111 052
	9	148 088	230 485
	10	102 319	87 067

**Table 4.15:** (7 minority : 3 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

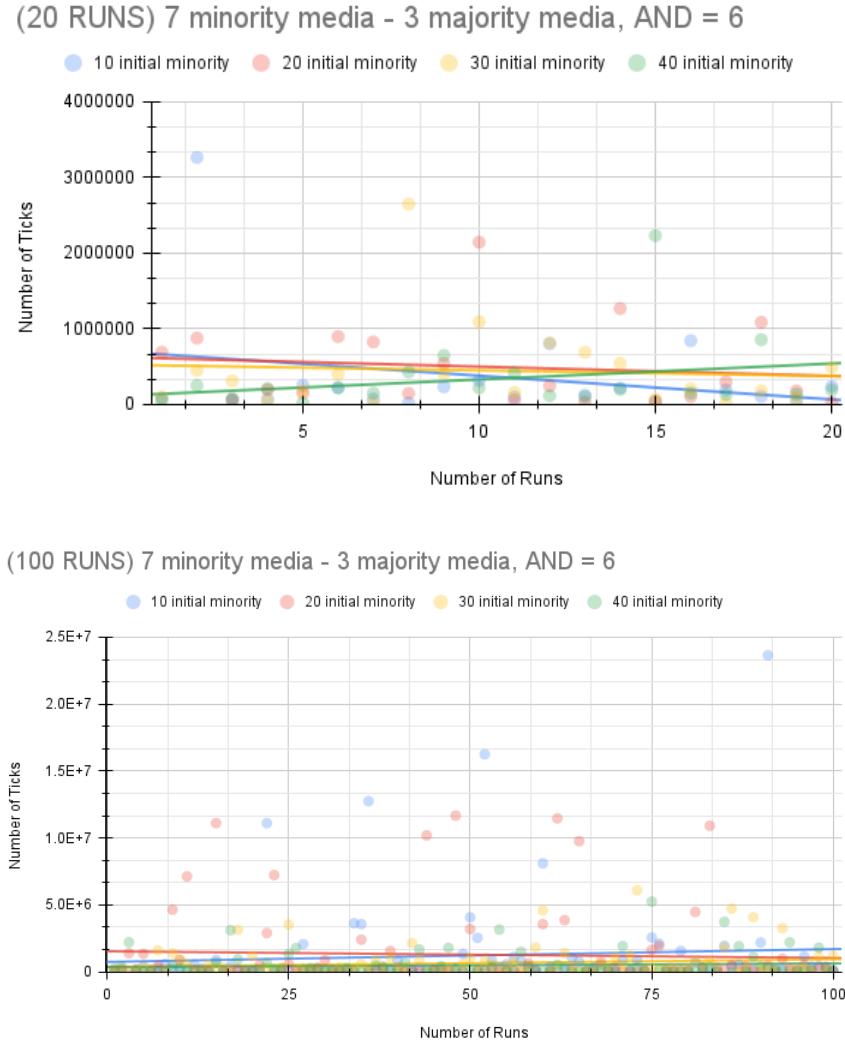
In Table 4.15, the row with an AND value of 10 has provided the least and fastest average number of 87 067 ticks after 100 runs. Moreover, the highest and slowest, average time value of 657 479 ticks, in the set of 100 runs, was given by a value of 6 AND.

### 40% Minority non-media nodes

Media Effects Model with 10% media nodes (7 minority : 3 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	341 236	492 819
	7	121 345	238 632
	8	101 815	129 594
	9	88 599	95 369
	10	71 286	93 439

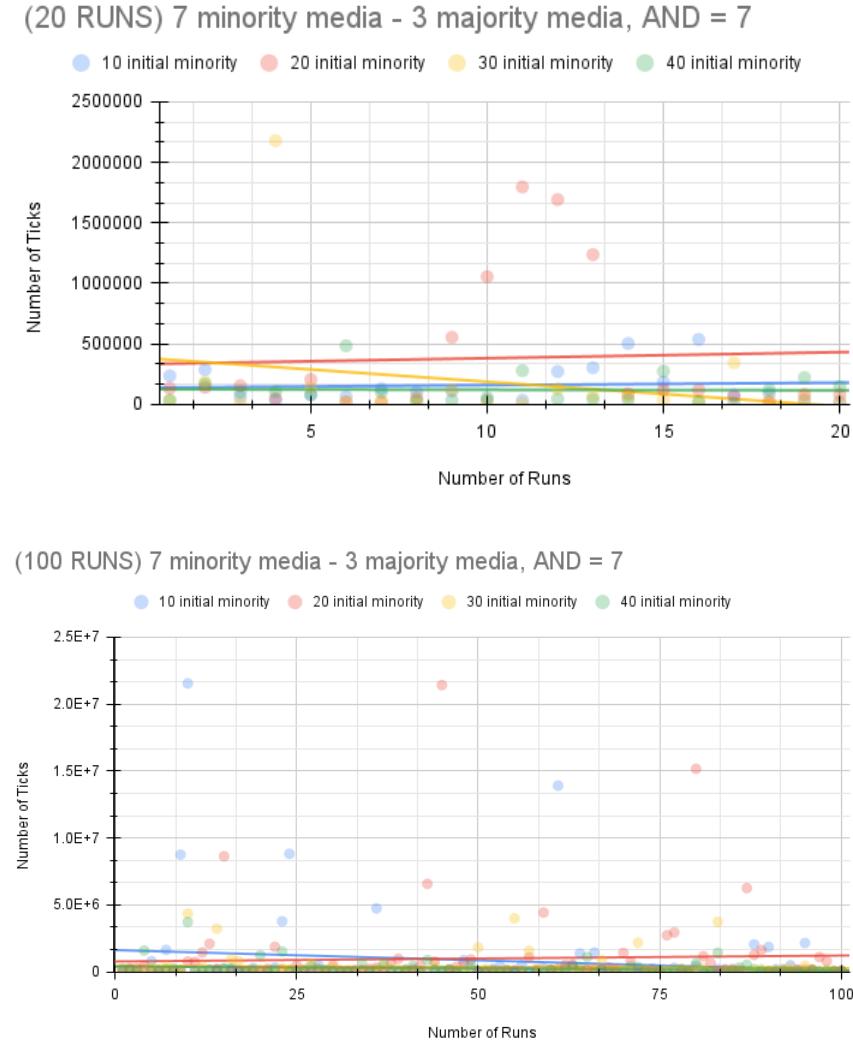
**Table 4.16:** (7 minority : 3 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

From Table 4.16, the least average number of ticks was given by a value of 10 AND, which has provided an average of 93 439 ticks after 100 runs. Additionally, the worst combination was with an AND value of 6, which has an average number of 492 819 ticks after 100 runs.



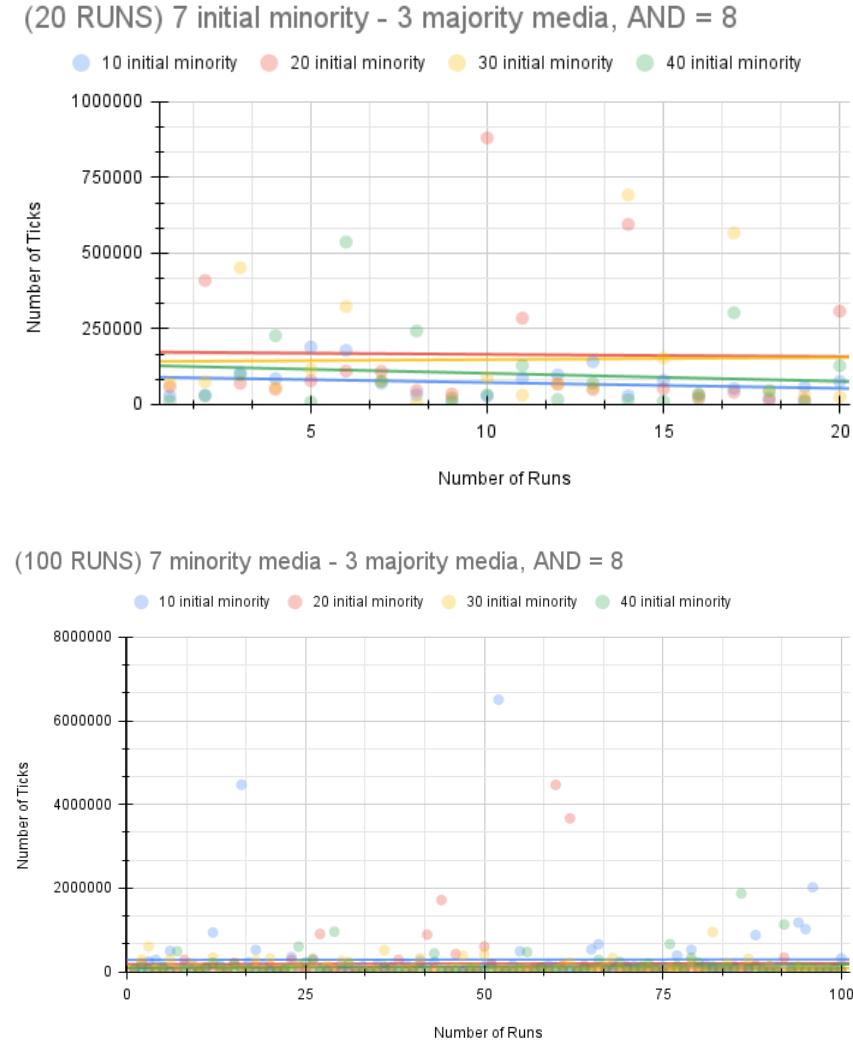
**Figure 4.20:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 6 and a ratio of 7 minority : 3 majority media nodes.

In the set of 20 runs from Figure 4.20, three of the four trends have decreased by 17.4% (blue), 349% (red), and 32.1% (yellow); except for the trend formed by the data points with an initial value of 40 minority non-media nodes, which had an increase of about 32.1%. Meanwhile, for the set of 100 runs, three of the four trends have increased by 17.4%, 21.9%, and 16.2% for the blue, yellow, and green trends, respectively. Only the red trend had a decrease of 16.3%.



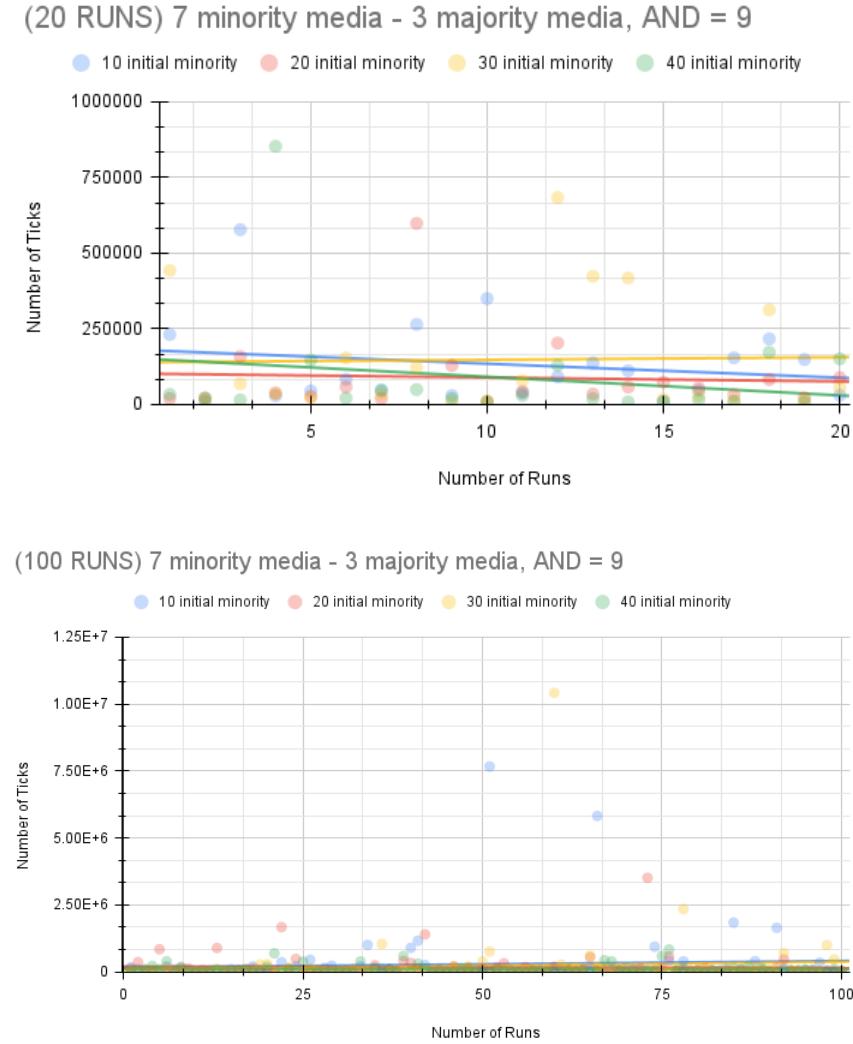
**Figure 4.21:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 7 and a ratio of 7 minority : 3 majority media nodes.

From Figure 4.21, the set of 20 runs has three increasing trends, all of which had risen by 133% for the blue trend, 50.3% for the red trend, and 120% for the green trend. The only declining trend was the yellow trend, which had a decrease of 343%. On the set of 100 runs, the blue, yellow, and green trends have decreasing trends of 0.566%, 17.7%, and 3.16%, respectively. The red trend, on the other hand, had an increase of 14.7%.



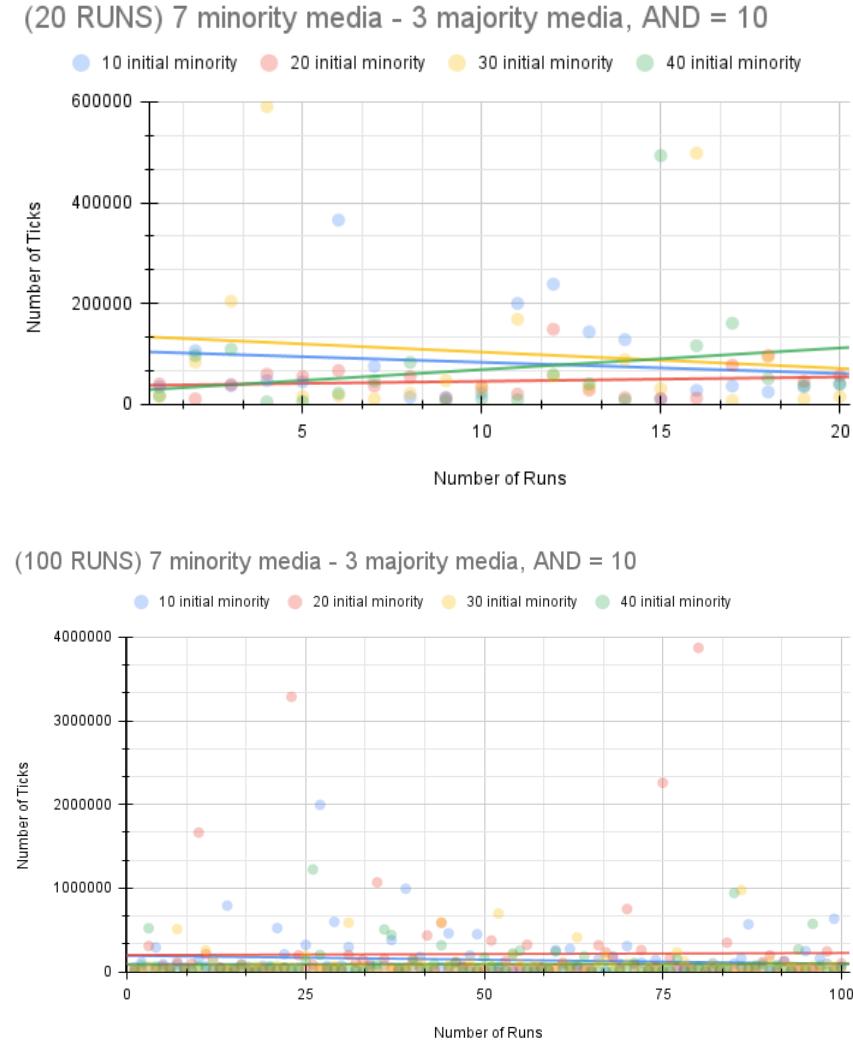
**Figure 4.22:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 8 and a ratio of 7 minority : 3 majority media nodes.

In the set of 20 runs from Figure 4.22, three of the four trends have decreasing trends of 224% for the blue trend, 121% for the red trend, and 69.4% for the green trend. The yellow trend, on the other hand, has increased by 34.1%. On the set of 100 runs, all of the trends have increased by 0.0041% for the blue trend, 25.4% for the red trend, 38.7% for the yellow trend, and 0.786% for the green trend.



**Figure 4.23:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 9 and a ratio of 7 minority : 3 majority media nodes.

In Figure 4.23, the data points with an initial value of 30 minority non-media nodes has formed a trend with 42.9% increase. The remaining three trends formed by the data points with initial values of 10, 20, and 40 minority non-media nodes have decreasing trends of 401%, 63.8%, and 238%, respectively. Meanwhile, in the set of 100 runs, half of the trends have increased by 44.6% (blue) and 21.1% (yellow). The other half of the trends have 28.7% and 0.0849% decreases for the red and the green trends, respectively.



**Figure 4.24:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 10 and a ratio of 7 minority : 3 majority media nodes.

In the set of 20 runs from Figure 4.24, the trends formed by the data points with initial values of 10 and 30 minority non-media nodes have decreasing trends of 266% and 232%, respectively. While the trends formed by the data points with initial values of 20 and 40 minority non-media nodes have increased correspondingly by 101% and 151% throughout the 20 runs. The set of 100 runs has three of its four trends having increasing trends. Particularly, the red, yellow, and green trends have increased by 15.1%, 6.89%, and 29.3%, respectively. The remaining blue trend has a decreasing trend of 6.16%.

The overall best combination for the set of 20 runs, from Table 4.14, was with an initial ratio of 20 minority : 80 majority non-media nodes. The matching value of AND for this was also 10. This combination has provided an average time of 46 479 ticks. Meanwhile, for the set of 100 runs, the best combination, from Table 4.15, was given by the pair with an initial ratio of 30 minority : 70 majority non-media nodes, and an AND value of 10 (87 067 ticks).

The overall worst combinations for the sets 20 and 100 runs, from Table 4.14, were both given by the pair with an initial proportion of 20% minority non-media nodes and an AND value of 6, where each set of runs had an average time value of 494 182 ticks and 1 281 531 ticks, respectively.

The conditions that benefited the minority opinion in this proportion of minority media were parallel to the ones that were already discussed before. Nevertheless, there were also scenarios that were like the previous simulations where the minority opinion had difficulty moving across the network. Again, this is because the minority media nodes were sometimes assigned lower numbers of links, along with the absence of nearby minority non-media nodes in its range. There were also instances where the majority media nodes have received most of the settings that favored the spreading of the minority opinion in a network.

#### 4.1.5 60% Minority Media Nodes: 6 minority - 4 majority

This proportion of minority media was when the model had started encountering random cases of the minority opinion failing. The proportion of minority media, for this subsection, was decreased to 60% of the total number of media nodes.

### 10% Minority non-media nodes

Media Effects Model with 10% media nodes (6 minority : 4 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	919 603	1 248 956
	7	800 098	1 429 509
	8	639 817	819 521
	9	458 634	449 328
	10	192 277	505 312

**Table 4.17:** (6 minority : 4 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.17, the least average number of 449 328 ticks, in the set of 100 runs, was given by a value of 9 AND. Additionally, the row with an AND value of 7 has provided the worst combination for this proportion of minority non-media nodes, with an average of 1 429 509 ticks from the set of 100 runs.

### 20% Minority non-media nodes

Media Effects Model with 10% media nodes (6 minority : 4 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	760 788	898 736
	7	872 928	835 635
	8	268 016	1 142 451
	9	260 912	719 368
	10	154 254	344 694

**Table 4.18:** (6 minority : 4 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

For this proportion of minority non-media nodes, the row with an AND value of 10 in Table 4.18 has provided the least average number of 344 694 ticks from the set of 100 runs. Also, the combination with an AND value of 8 has the highest average number of ticks for the set of 100 runs.

### 30% Minority non-media nodes

Media Effects Model with 10% media nodes (6 minority : 4 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	693 906	671 920
	7	1 206 372	805 460
	8	398 196	913 375
	9	253 880	562 288
	10	184 751	250 786

**Table 4.19:** (6 minority : 4 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

From Table 4.19, the row with an AND value of 10 has provided the least average number of 250 786 ticks from the set of 100 runs. Additionally, the highest average number of ticks was given by a value of 8 AND, with an average of 913 375 ticks after 100 runs.

### 40% Minority non-media nodes

Media Effects Model with 10% media nodes (6 minority : 4 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	1 044 885	1 122 486
	7	558 028	855 787
	8	413 094	1 578 415
	9	639 490	579 925
	10	174 059	277 778

**Table 4.20:** (6 minority : 4 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

From Table 4.20, the best combination was given by a value of 10 AND, which has provided an average time of 277 778 ticks in the set of 100 runs. Moreover, the row with an AND value of 8 has the highest average number of 1 578 415 ticks in the set of 100 runs, which was the least favorable combination for this proportion of minority non-media nodes.



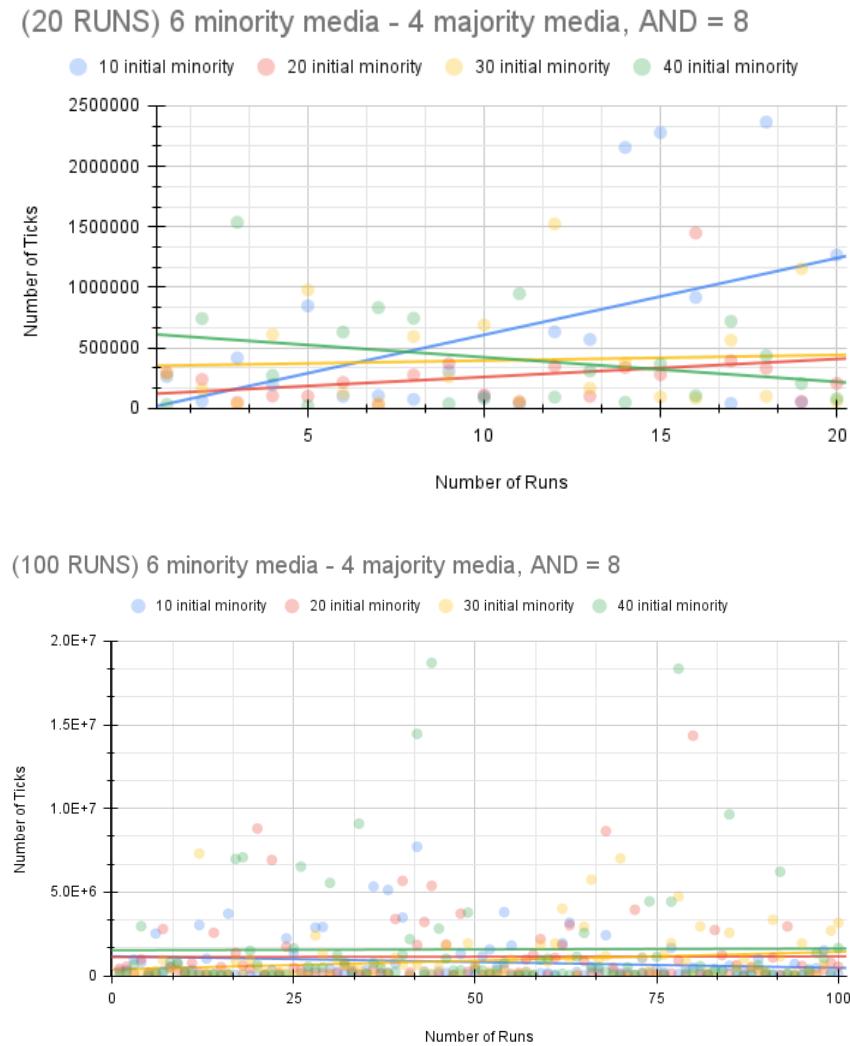
**Figure 4.25:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 6 and a ratio of 6 minority : 4 majority media nodes.

Half of the trends in the set of 20 runs from Figure 4.25 have increased by 437% and 208% for the data points with initial values of 20 and 40 minority non-media nodes, respectively. The other half of the trends have decreased by 20.4% and 321% for the corresponding data points with initial values of 10 and 30 minority non-media nodes. The set of 100 runs have two trends that has increasing trends of 0.537% and 0.956%, with corresponding initial values of 20 and 40 minority non-media nodes, while the remaining two initial values has decreasing trends of 8.1% (blue) and 10.6% (yellow).



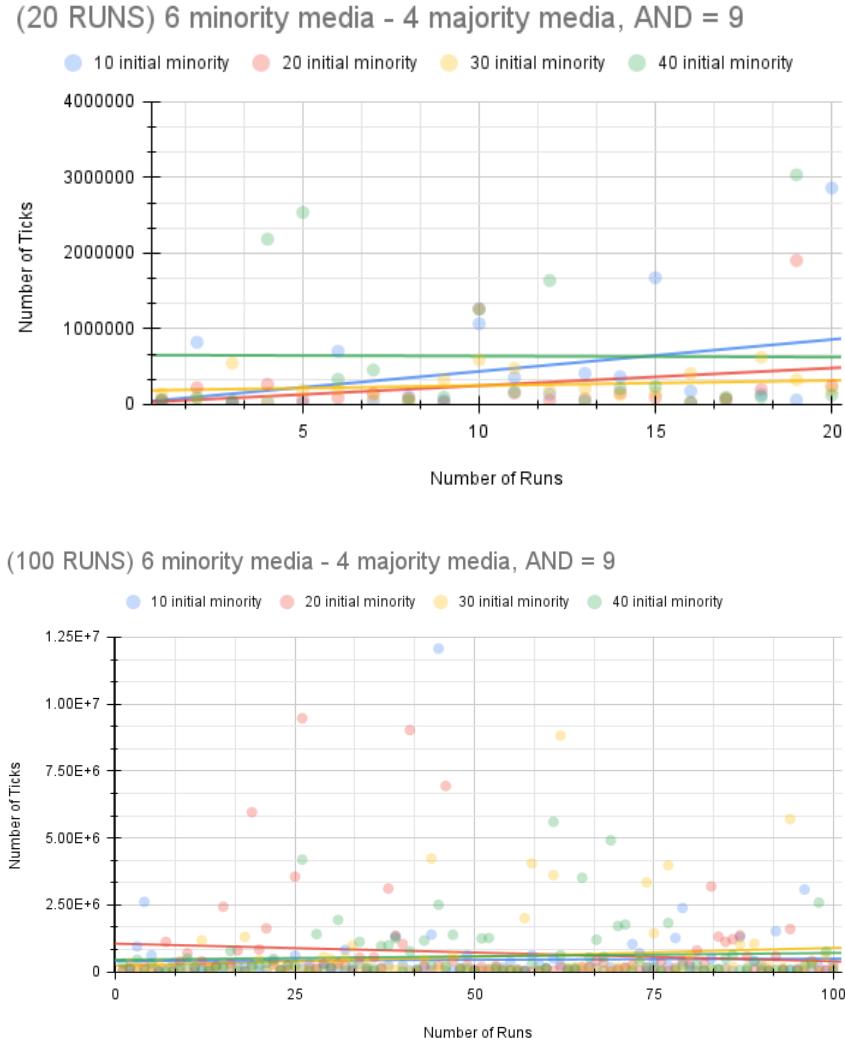
**Figure 4.26:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 7 and a ratio of 6 minority : 4 majority media nodes.

Three of the four trends in the set of 20 runs have decreasing trends of 208% (blue), 205%, (red) and 179% (yellow). The only increasing trend was provided by the data points with an initial value of 40 minority non-media nodes, which had a 233% increase. Similarly in the set of 100 runs, three of the four trends had increasing trends of 14.9% (blue), 6.99% (red), and 8.28% (green). The yellow trend was the only one that had a decrease of 27% in its trend.



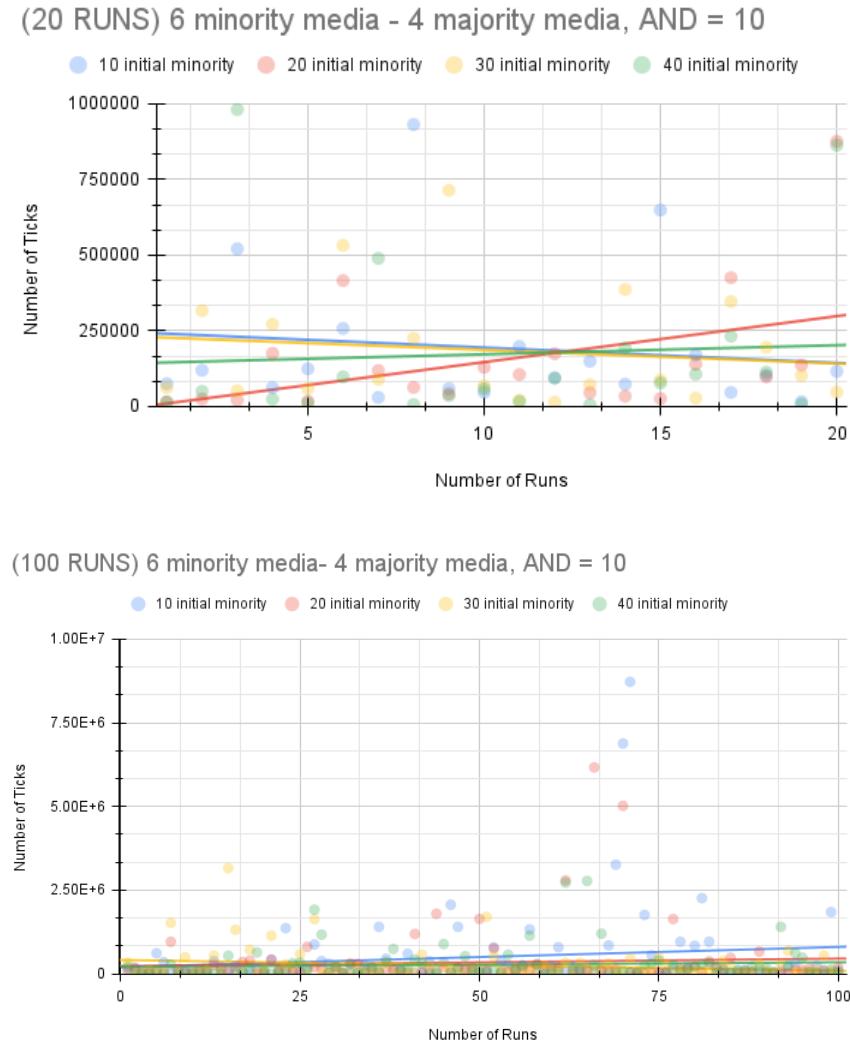
**Figure 4.27:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 8 and a ratio of 6 minority : 4 majority media nodes.

The data points with initial values of 10, 20, and 30 minority non-media nodes in the set of 20 runs have increased by 316%, 187%, and 202% in trends, respectively. Furthermore, the data points with an initial value of 40 minority non-media nodes has formed a decreasing trend of 203%. Meanwhile, in the set of 100 runs, three of the four trends have increasing trends of 21.3% for the red trend, 39.9% for the yellow trend, and 53.3% for the green trend. Additionally, the blue trend has a decreasing trend of 3.86%.



**Figure 4.28:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 9 and a ratio of 6 minority : 4 majority media nodes.

From the set of 20 runs in Figure 4.28, the green trend, which is formed by the data points with an initial value of 40 minority non-media nodes, has a decrease of 282% in trend. The remaining three trends, on the other hand, have increasing trends of 109% for the blue trend, 5.27% for the red trend, and 114% for the yellow trend. In the set of 100 runs, three of the four trends have increased by 34.2% for the blue trend, 30.1% for the yellow trend, and 2.16% for the green trend. The remaining red trend has a decrease of 32.5% in its trend.



**Figure 4.29:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 10 and a ratio of 6 minority : 4 majority media nodes.

The trends in the set of 20 runs, from Figure 4.29, has half its trends having decreasing trends. Specifically, the blue and yellow trends have decreased by 91.2% and 309%, respectively. While the remaining two trends, red and green, have increased by 30% and 128%, respectively. In the set of 100 runs, three of the four trends have increasing trends of 6.04% (blue), 19.9% (red), and 3.59% (green); while the yellow trend has an increase of 27.4%.

For the set of 20 runs, the overall best combination was given by the pair with an

initial ratio of 40 minority : 60 majority non-media nodes, along with an AND of 10 from Table 4.20. This combination has the shortest average time value of 174 059 ticks for the set. Additionally, the overall best combination for the set of 100 runs was provided by the pair with an initial value of 30 minority non-media nodes, and an AND value of 10 (250 786 ticks) from Table 4.19.

The overall worst combination for the set of 20 runs was with the pair of an initial proportion of 30 minority non-media nodes, along with an AND value of 7 (1 206 372 ticks) from Table 4.19. On the other hand, the overall worst combination for the set of 100 runs was given by a value of 8 AND, with an initial proportion of 40 minority non-media nodes (1 578 415 ticks) from Table 4.17.

As previously discussed, this set of data have also come across the same advantages that benefited the minority opinion. Nevertheless, it was not enough to keep the minority opinion from failing. There were random cases of minority opinion failures that have occurred in this set of simulations. Specifically, this ratio of media nodes had an average of three (3) minority opinion failures for each pair of proportion of minority non-media nodes and AND value in the set of 20 runs. Moreover, for the set of 100 runs, the average number of minority opinion failures has increased to eight (8) for each combination of proportion of minority media nodes and AND value. Since the proportion of majority media has been increased to 40%, it became more challenging for the minority opinion to win. That is, the minority opinion would have a harder time to circulate the network as the number of majority media nodes grow. Another consideration was when the minority non-media nodes were all connected far-off from the minority media nodes, which yielded lower chances of survival for the minority opinion.

It is also worth noting that the advantage of having more links for the minority opinion can also lead to its downfall. If these advantages have been assigned to the majority media nodes, then the minority opinion would have taken longer than the average time to win against the majority, or worse, the minority opinion fails to overpower the perceived majority opinion.

#### 4.1.6 50% Minority Media Nodes: 5 minority - 5 majority

Continuing from the previous proportion of minority media, the data for this subsection have been obtained by executing two distinct sets of 20 and 100 runs of each pair of proportion of minority non-media nodes and AND value. Now, the proportions of media have been equally distributed as 50% minority media and 50% majority media. The average counts of minority opinion failures have also started to increase by this point.

##### 10% Minority non-media nodes

Media Effects Model with 10% media nodes (5 minority : 5 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	7 368 780	2 145 987
	7	4 379 473	1 637 516
	8	3 684 761	1 285 785
	9	2 723 188	1 111 666
	10	1 242 458	1 274 711

**Table 4.21:** (5 minority : 5 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.21, the best combination for this proportion of minority non-media nodes was given by a value of 9 AND, which has provided an average of 1 111 666 ticks from the set of 100 runs. Moreover, the highest average time value was with an AND value of 6, which has an average number of 2 145 987 ticks from the set of 100 runs.

### 20% Minority non-media nodes

Media Effects Model with 10% media nodes (5 minority : 5 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	5 222 331	1 596 189
	7	1 760 402	1 418 495
	8	2 722 287	1 471 822
	9	4 539 082	797 165
	10	2 312 769	868 522

**Table 4.22:** (5 minority : 5 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

The least average time value for this proportion of minority non-media nodes, from Table 4.22, was given by a value of 9 AND, which has provided an average time of 797 165 ticks from the set of 100 runs. Additionally, the worst combination was with an AND value of 6, which has an average time of 1 596 189 ticks from the set of 100 runs.

### 30% Minority non-media nodes

Media Effects Model with 10% media nodes (5 minority : 5 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	2 914 424	1 719 334
	7	3 218 766	1 376 761
	8	3 458 715	1 323 462
	9	841 833	1 297 710
	10	3 124 239	1 006 481

**Table 4.23:** (5 minority : 5 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

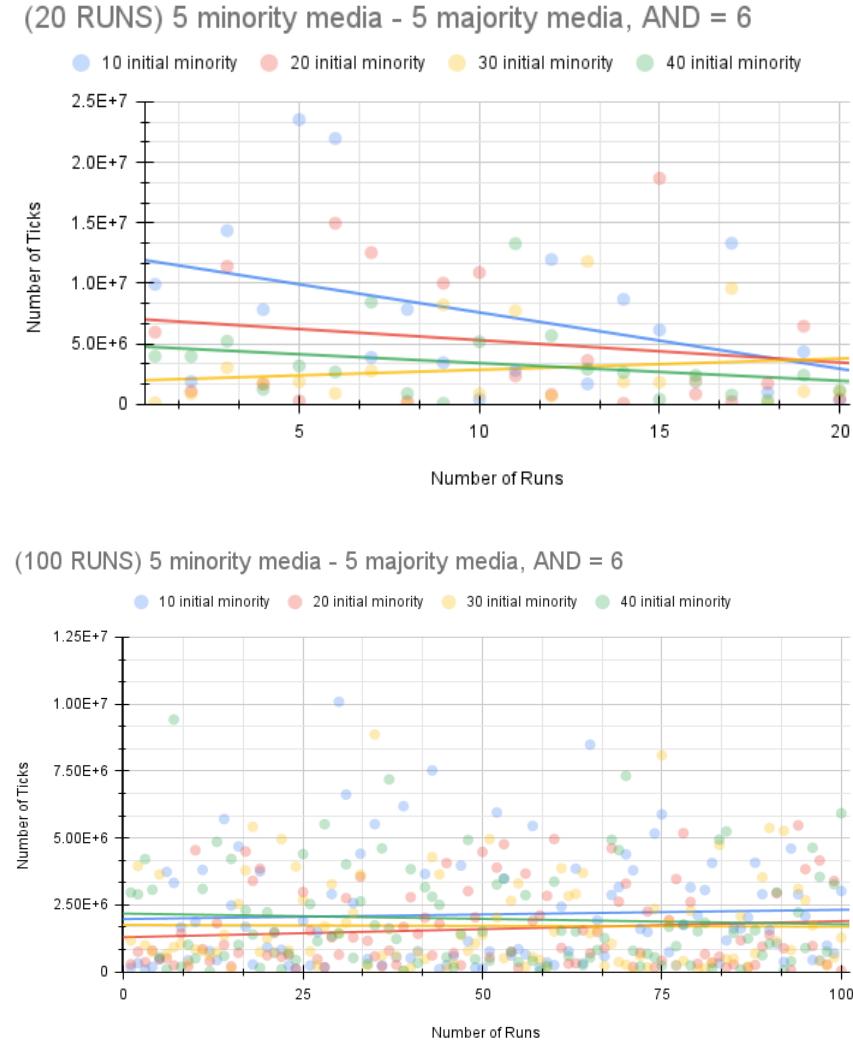
From Table 4.23, the row with an AND value of 10 has provided the least average time value of 1 006 481 ticks from the set of 100 runs. Moreover, the highest average time value was given by a value of 6 AND, which has provided an average number of 1 719 334 ticks from the set of 100 runs.

### 40% Minority non-media nodes

Media Effects Model with 10% media nodes (5 minority : 5 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	3 348 393	1 975 901
	7	2 000 482	1 682 276
	8	4 487 695	1 397 257
	9	2 203 798	1 234 861
	10	4 127 044	627 428

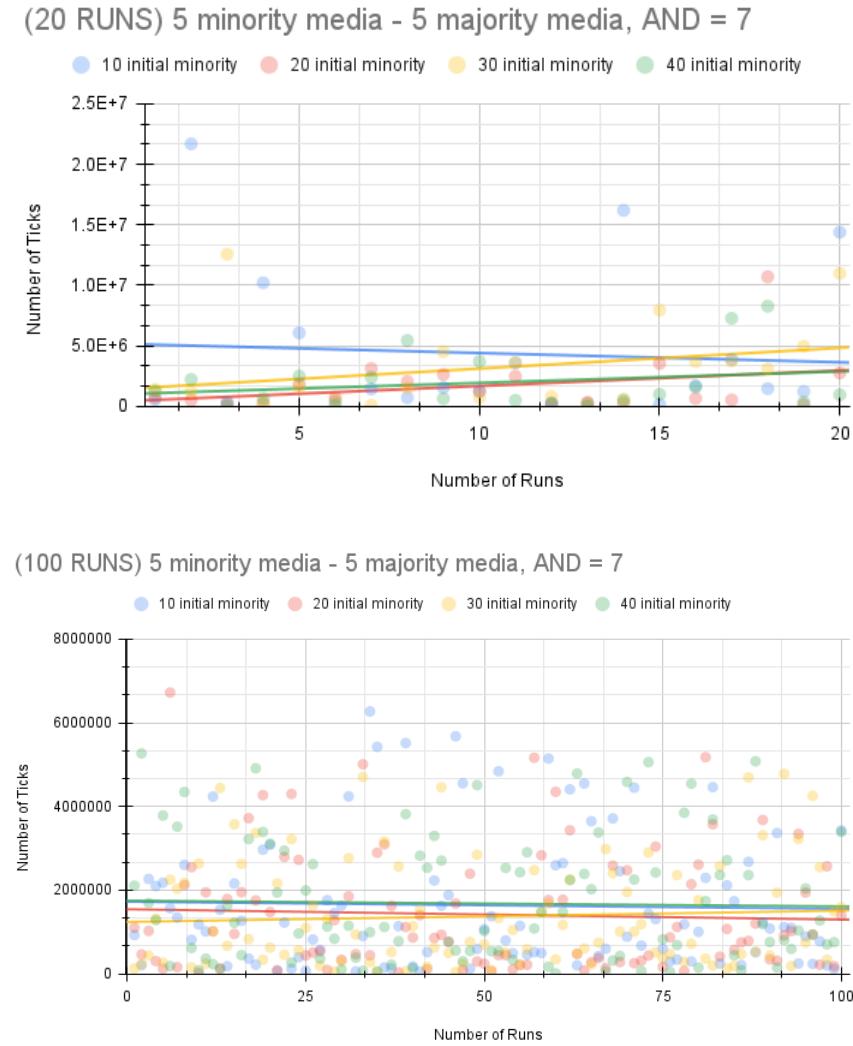
**Table 4.24:** (5 minority : 5 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

From Table 4.24, the row with an AND value of 10 has provided the least average time value of 627 428 ticks from the set of 100 runs. Additionally, the highest average number of ticks from the set of 100 runs was given by a value of 6 AND, which has provided an average number of 1 975 901 ticks.



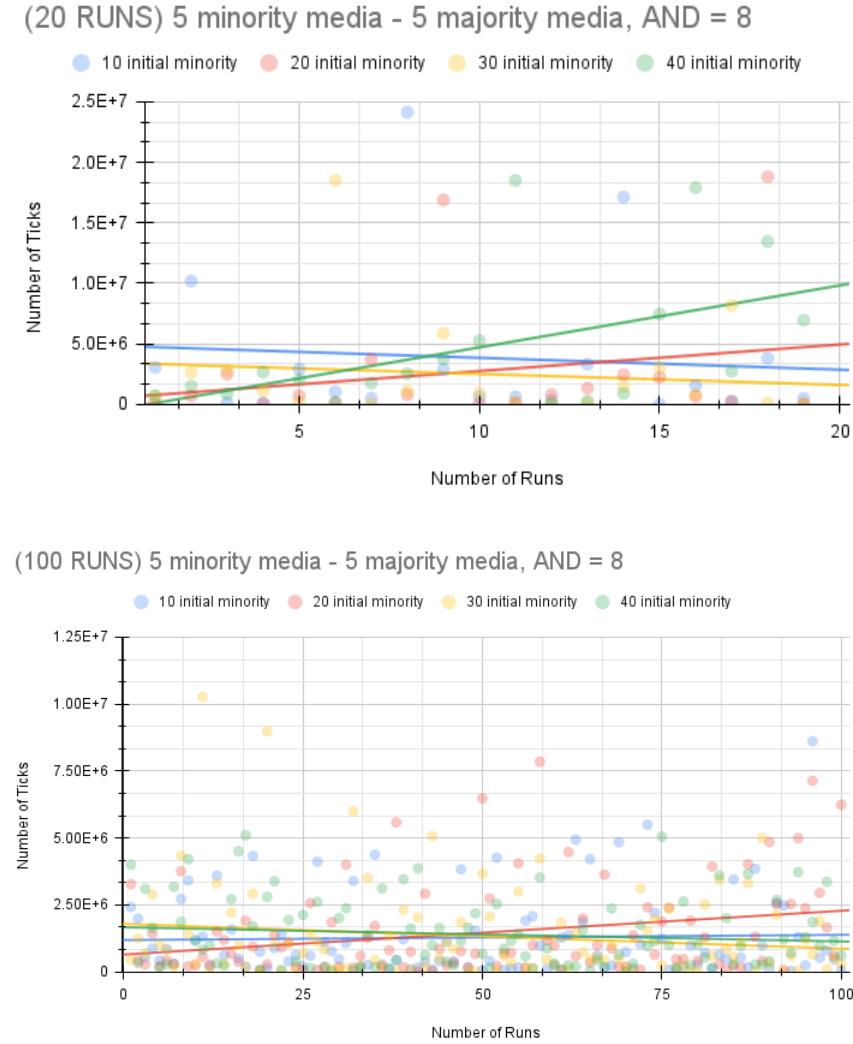
**Figure 4.30:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 6 and a ratio of 5 minority : 5 majority media nodes.

From Figure 4.30, three of the four trends in the set of 20 runs has decreased by 78.8% (red), 20.2% (yellow), and 248% (green). The data points with an initial value of 10 minority non-media nodes has increased by 271%. In the set of 100 runs, the first half of the trends have increased by 46.2% (blue) and 17.2% (red). The latter half, consisting of the yellow and the green trends, have decreased by 19% and 21.6%, respectively.



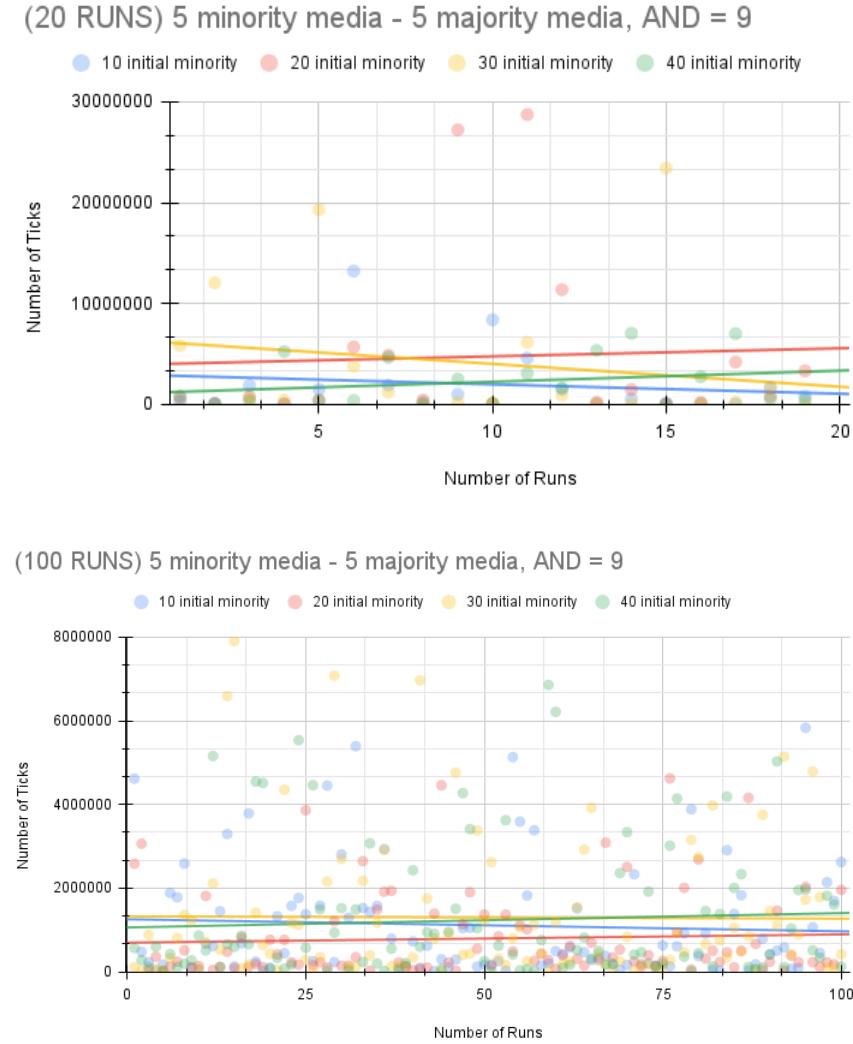
**Figure 4.31:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 7 and a ratio of 5 minority : 5 majority media nodes.

From Figure 4.31, in the set of 20 runs, only the blue trend had decreased by 248%. The remaining three trends had increasing lines with approximate changes of 585% (red), 469% (yellow), and 102% (green). Similarly for the set of 100 runs, only the yellow trend has an increasing trend of 13.4%. Additionally, the other three remaining trends had decreased by 6.29% for the blue trend, 24.9% for the red trend, and 5.73% for the green trend.



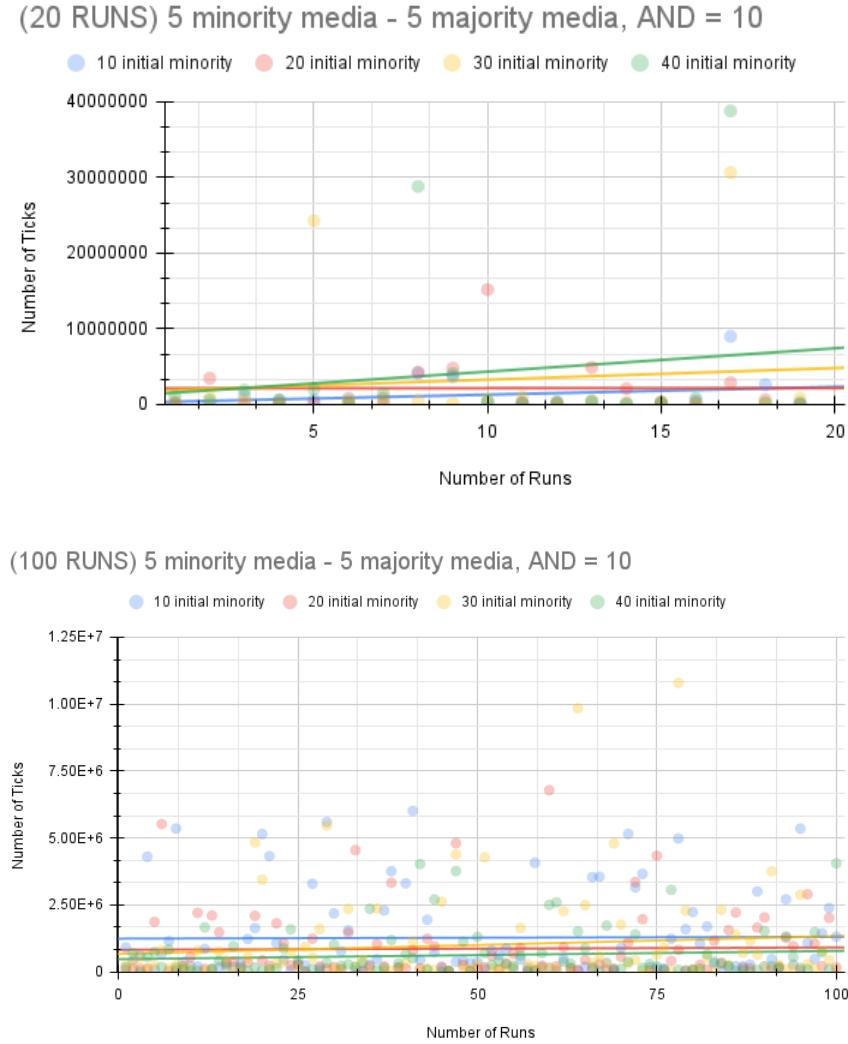
**Figure 4.32:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 8 and a ratio of 5 minority : 5 majority media nodes.

The set of 20 runs in Figure 4.32 has half of its trends having decreasing trends and the other half having increasing trends. Particularly, the blue and the yellow trends have decreased by 229% and 211%, respectively, while the red and green trends have corresponding increases of 309% and 151%. In the set of 100 runs, the first half of the trends, namely, the blue and the red trends, have increased by 34.1% and 2.56%, respectively. The latter half of the trends have decreased by 13.5% for the yellow trend, and 12.4% for the green trend.



**Figure 4.33:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 9 and a ratio of 5 minority : 5 majority media nodes.

Half of the trends in the set of 20 runs, from Figure 4.33, have increasing trends. Specifically, the red and the green trends have increased by 4.05% and 129%, respectively. The remaining half of the trends, formed by the data points with initial values of 10 and 30 minority non-media nodes, have decreasing trends of 440% and 116%, respectively. Similarly, half of the trends in the set of 100 runs have decreasing trends of 23.9% for the blue trend, and 27% for the yellow trend. The remaining half of the trends, red and green, have increased by 8.9% and 15.7%, respectively.



**Figure 4.34:** (20 runs vs. 100 runs) Data points plotted for all values of initial minority non-media nodes, with an AND of 10 and a ratio of 5 minority : 5 majority media nodes.

All the trends in the set of 20 runs from Figure 4.34 (20 runs) have increased by 329% for the blue trend, 21.1% for the red trend, 342% for the yellow trend, and 31.9% for the green trend. Similarly, all trends in the set of 100 runs have increasing trends of 4.82% for the blue trend, 19.7% for the red trend, 23.2% for the yellow trend, and 15% for the green trend.

The overall best combination for this set of 20 runs was given by the pair with an initial proportion of 10% minority to 90% majority non-media nodes, along with an

AND of 10 from Table 4.21; which has provided an average time of 1 242 458 ticks. On the other hand, the overall best combination for the set of 100 runs was given by the pair with an initial ratio of 40 minority : 60 majority non-media nodes, plus an AND value of 10 (627 428 ticks) from Table 4.24.

On the contrary, the overall worst combinations for both sets of executions was defined by the pair with an initial ratio of 10 minority : 90 majority non-media nodes, along with an AND value of 6 from Table 4.21.

Note that since there is a 50% chance of the minority opinion to win, then there is also that other 50% that denotes its failure. Despite the instances where the minority opinion fails, there were still combinations (as specified above) that have provide the shortest average time values for these sets of 20 and 100 runs.

From the simulations executed for this proportion of minority media, the minority opinion had encountered difficulties spreading through the network. Recall that the advantages of the minority media nodes, which were discussed in earlier sets of simulations, can also become its disadvantages when assigned to the majority media nodes. Also note that this proportion of minority media represented a 50-50 chance for both opinions to win, which implies the probability of the minority opinion's defeat. All proportions of minority non-media nodes in the set of 20 runs have an average of 26 minority opinion failures, which is significantly higher than the count from the previous set of executions. Furthermore, this count of minority opinion failures has increased to 135 for the set of 100 runs.

#### 4.1.7 30% Minority Media Nodes: 3 minority - 7 majority

Skipping ahead, more distinct sets of 20 and 100 runs were executed with lesser minority media, to examine if the minority opinion still has an opportunity to succeed in such conditions. For this set, the proportion of the minority media has been decreased to 30%.

### 10% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (3 minority : 7 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	2 810 287	261 385
	7	1 546 686	117 259
	8	17 210	78 637
	9	10 728	11 644
	10	18 852	21 667

**Table 4.25:** (3 minority : 7 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.25, the most favorable combination, for this proportion of minority non-media nodes, was with an AND value of 6, which has provided the highest average number of 261 385 ticks from the set of 100 runs. Moreover, the least average time value was given by a value of 9 AND, which has provided an average of 11 644 ticks from the set of 100 runs. Note that in this case, the highest average time values were now considered as the most favorable for the spreading of the minority opinion, despite its failure to overpower the perceived majority.

### 20% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (3 minority : 7 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	5 361 631	296 558
	7	1 823 875	185 823
	8	1 042 320	118 772
	9	162 643	28 161
	10	176 049	31 043

**Table 4.26:** (3 minority : 7 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

The row with an AND value of 9, from Table 4.26, has provided the highest average number of 296 558 ticks for the set of 100 runs, which was considered to be the most favorable condition for this proportion of minority non-media nodes. Additionally, the worst combination was with an AND value of 6, which has provided an average of 28 161 ticks for the set of 100 runs. Again, note that the highest average time value for this proportion of minority media nodes denotes the longest running time before the minority opinion fails to spread in the network.

### 30% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (3 minority : 7 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	4 099 948	774 810
	7	773 467	198 136
	8	762 852	111 148
	9	32 115	76 231
	10	28 111	66 662

**Table 4.27:** (3 minority : 7 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

The most favorable condition for the minority opinion in Table 4.27 is with an AND value of 6, which has provided an average number of 774 810 ticks for the set of 100 runs. On the contrary, the least average time value for this proportion of minority non-media nodes was given by a value of 10 AND, with an average time of 66 662 ticks for the set of 100 runs. Again, for this proportion of minority media nodes, the highest time value was the most favorable since it took longer for the minority opinion to fail against the perceive majority.

### 40% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (3 minority : 7 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	3 188 704	595 394
	7	645 373	336 603
	8	1 397 451	185 174
	9	104 853	142 942
	10	28 726	49 945

**Table 4.28:** (3 minority : 7 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

Similarly, in Table 4.28, the highest average time given by this set of non-media nodes was with an AND value of 6, which has provided an average of 595 394 ticks for the set of 100 runs. On the other hand, the least average number of 49 945 ticks was given by a value of 10 AND for this proportion of minority non-media nodes. As a remark, the highest average time value in this proportion of minority media was considered the most favorable since it is the longest average running time for the minority opinion to fail against the perceived majority opinion.

Notice that the previous simulations up until this set have given time values where the minority opinion has successfully spread throughout the network. On the contrary, this set only contains **minority opinion failures**. The combination that has provided the overall most favorable outcome for the set of 20 runs, from Table 4.26, was with an initial ratio of 20% minority : 80% majority non-media nodes, and an AND of 6. This combination has provided an average time of 5 361 631 ticks before the minority opinion fails. On the other hand, the overall most favorable combination for the set of 100 runs was given by the pair with an initial ratio of 30 minority : 70 majority non-media

nodes, and an AND value of 6 (see Table 4.27). The average time value supplied by this combination is 774 810 ticks.

The overall least favorable combinations for both sets of 20 and 100 runs, from Table 4.25, were given by the pair with an initial ratio of 10 minority : 90 majority non-media nodes, and an AND value of 9 (10 728 ticks and 11 644 ticks, respectively). Considering that this set of data has provided only minority opinion failures, then the shortest average time values would have been treated as the worst rather than as the best combinations.

Recall that some of the features that guaranteed the success of the minority opinion from previous simulations were (1) having a high value of AND, (2) having an abundance of minority media nodes present, preferably surrounding the majority media nodes, and (3) having the minority non-media nodes connected closely to the minority media nodes. In these simulations, the majority media nodes received most, if not all, of these characteristics in each execution. Moreover, the proportion of the majority media has increased to more than half of the total media nodes, which was already an advantage by itself. This further proves the point that once the majority media nodes gain these advantages, then the chances of the minority opinion winning substantially decreases.

#### 4.1.8 10% Minority Media Nodes: 1 minority - 9 majority

The proportion of minority media has been decreased to 10% of the total number of media nodes. After executing new sets of 20 and 100 runs for each variation of the simulation, the minority opinion unsurprisingly fails. Specifically, the time it takes for the minority opinion to fail has been reduced with the increase of the proportion of majority media.

### 10% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (1 minority : 9 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
10 : 90	6	2 577	4 704
	7	2 841	3 114
	8	5 311	1 829
	9	1 139	15 729
	10	1 364	1 400

**Table 4.29:** (1 minority : 9 majority) A table of the average number of ticks, with its corresponding AND value and 10% initial value for the minority non-media nodes.

From Table 4.29, the highest average time value for the set of 100 runs is 15 729 ticks, which was considered as the most favorable for this proportion of minority non-media nodes. Furthermore, the least average number of ticks was given by a value of 10 AND, which has provided an average of 1 400 ticks for the set of 100 runs.

### 20% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (1 minority : 9 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
20 : 80	6	12 569	16 846
	7	5 866	6 300
	8	30 203	4 453
	9	6 913	3 120
	10	1 445	3 201

**Table 4.30:** (1 minority : 9 majority) A table of the average number of ticks, with its corresponding AND value and 20% initial value for the minority non-media nodes.

In Table 4.30, the most favorable condition was with a value of 6 AND, which has provided an average of 16 846 ticks for the set of 100 runs. Additionally, the least average time value was given by a value of 9 AND, which has provided an average number of 3 120 ticks from the set of 100 runs.

### 30% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (1 minority : 9 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
30 : 70	6	50 843	19 371
	7	28 820	11 456
	8	5 419	6 629
	9	8 986	7 143
	10	9 373	5 261

**Table 4.31:** (1 minority : 9 majority) A table of the average number of ticks, with its corresponding AND value and 30% initial value for the minority non-media nodes.

The most favorable condition, from Table 4.31, was with an AND value of 6, which has provided an average of 19 371 ticks from the set of 100 runs. Moreover, the least average number of ticks for this proportion of minority non-media nodes was given by a value of 10 AND, with an average of 5 261 ticks for the set of 100 runs.

### 40% Minority non-media nodes (Minority Opinion Failures)

Media Effects Model with 10% media nodes (1 minority : 9 majority)			
Initial ratio of nodes (minority : majority)	AND	Average ticks (20 runs)	Average ticks (100 runs)
40 : 60	6	20 423	18 655
	7	23 142	16 438
	8	13 144	10 326
	9	8 136	10 273
	10	7 021	5 675

**Table 4.32:** (1 minority : 9 majority) A table of the average number of ticks, with its corresponding AND value and 40% initial value for the minority non-media nodes.

For Table 4.32, the highest average time value for this proportion of minority non-media nodes was given by a value of 6 AND, with an average time of 18 655 ticks. Moreover, the row with a value of 10 AND has provided the least average time value of 5 675 ticks.

The overall most favorable conditions for the minority opinion for the sets of 20 and 100 runs, from Table 4.31 were both given by the combination with an initial ratio of 30% minority : 70% majority non-media nodes, and an AND of 10. The average time values provided by this combination is 50 843 ticks and 19 371 ticks, respectively. Note that the most favorable condition for this set, which supplied the highest average number of ticks, implies that the minority opinion has first struggled to conquer the majority opinion, even if it failed to do so.

The overall worst combinations for both sets of 20 and 100 runs were both given by an initial ratio of 10 minority : 90 majority non-media nodes from Table 4.29. They only differed in the values of AND with the set of 20 runs having an AND value of 9 (1 139 ticks), and the set of 100 runs having an AND value of 10 (1 400 ticks). These

combinations have provided the lowest average time values, which indicated how fast the minority opinion failed.

In this proportion of minority media, the majority media have inherited the advantages that the minority media must have to secure the successful spreading of the minority opinion in a network. From previous explanations, this generally means that the minority opinion has encountered many obstacles in its progress of spreading in a network. In this case, the minority opinion not only struggled with moving across the network, but it also failed to overcome the perceived majority opinion.

## 4.2 Effects of High AND values

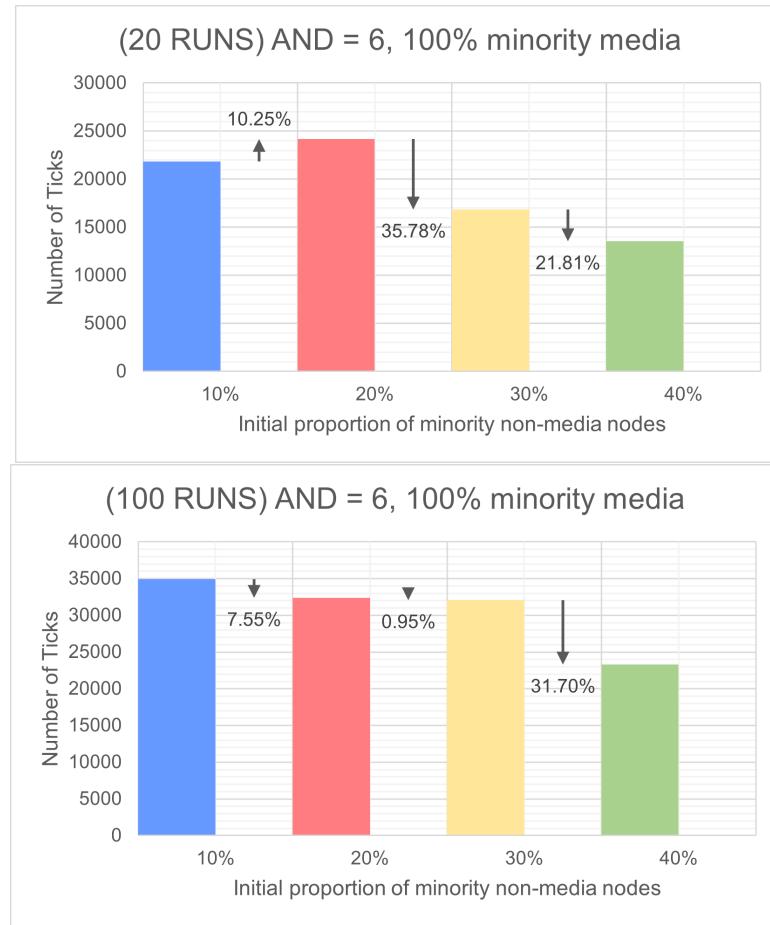
Both Alvarez-Galvez [1] and Narraido [21] have stated in their studies that the minority opinion has a higher chance of succeeding when the value of AND is greater than five. Moreover, from Equation 3.2, the number of links given to one node were randomly assigned, as long as the average of all degrees of the nodes was met. Higher values of AND provided more links for some of the nodes in the network. Preferably, these higher counts of links would be assigned to the minority media nodes for the minority opinion to successfully spread in the network.

In this section, the values of AND have fixed at 6, 7, 8, 9, and 10. The parameters that have been modified are the proportions of the media and the non-media nodes. The proportions of the minority media have been set to 100%, 90%, 80, 70%, 60%, and 50%. These percentages have provided successes for the minority opinion. Each average time values in this section have been obtained through two sets of 20 and 100 runs.

### 4.2.1 AND value of 6

In this subsection, the AND value has been fixed to 6. The values for the media nodes have been set to 100%, 90%, 80%, 70%, 60%, and 50%. Similarly, the initial values for the minority non-media nodes have been set to 10%, 20%, 30%, and 40%.

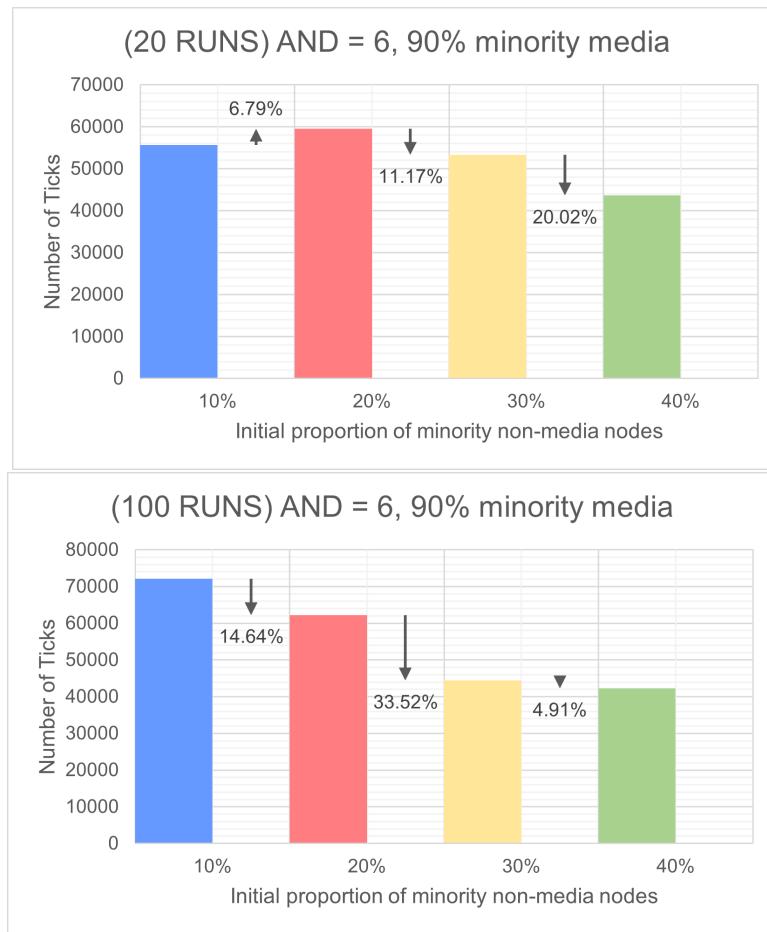
**100% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.35:** (10 minority : 0 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.35, the differences between the average numbers of ticks in the set of 20 runs have increased by 47.34% as the initial values for the minority non-media nodes were increased from 10% to 40%. Similarly, the differences between the average time values in the set of 100 runs have increased by 40.2% as the initial values for the minority non-media nodes also increased. Additionally, the number of increases in the differences of average time values was greater in the set of 100 runs.

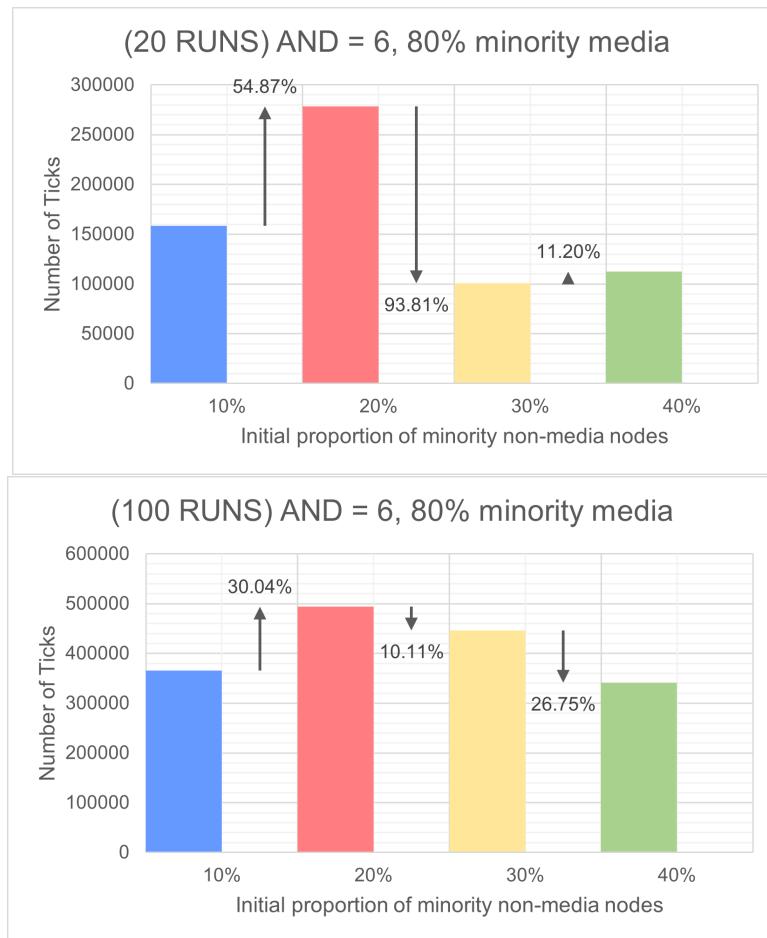
**90% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.36:** (9 minority : 1 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences between the average numbers of ticks in the set of 20 runs have increased by 24.4% as the initial values for the minority non-media nodes were increased from 10% to 40%. In the set of 100 runs, the differences between the average time values have also increased by 53.07% as the initial values for the minority non-media nodes were increased. Moreover, with the increase in the number of executions from 20 to 100 in Figure 4.36, the number of increases in the differences of average time values was greater by one more difference in the set of 100 runs.

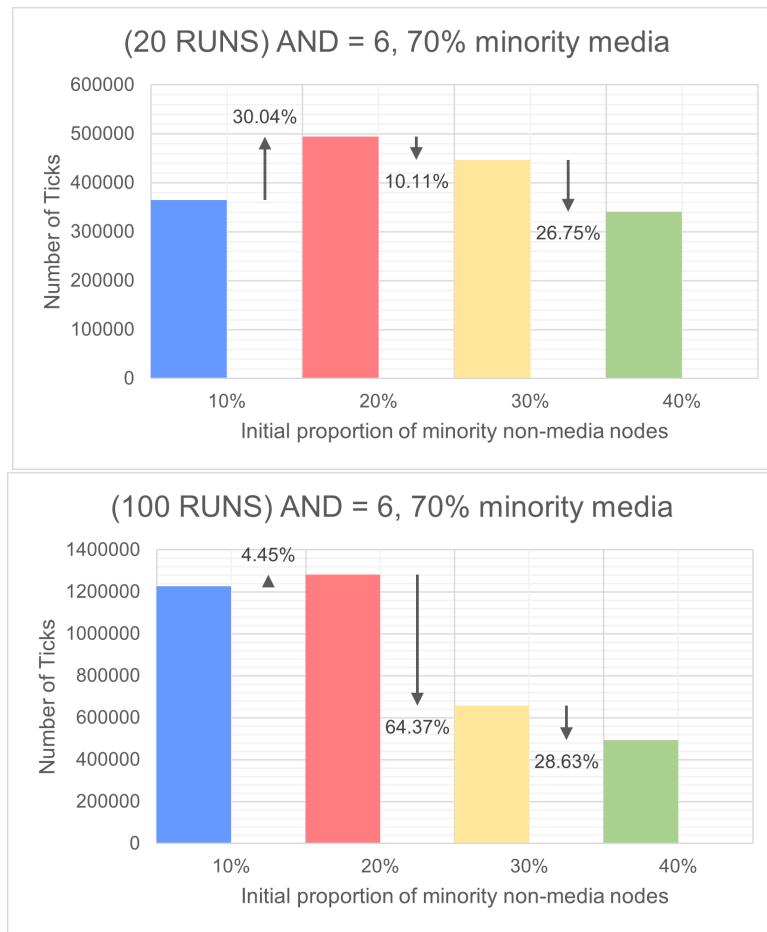
**80% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.37:** (8 minority : 2 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.37, the differences in average time values, for the set of 20 runs, have increased by 50.14% as the initial proportions of minority non-media have increased from 10% to 40%. Likewise, in the set of 100 runs, the differences in its average time values have increased by 6.82% as the proportions of minority non-media nodes increased. Moreover, the number of increases in the differences of average time values was greater by one more difference in the set of 100 runs.

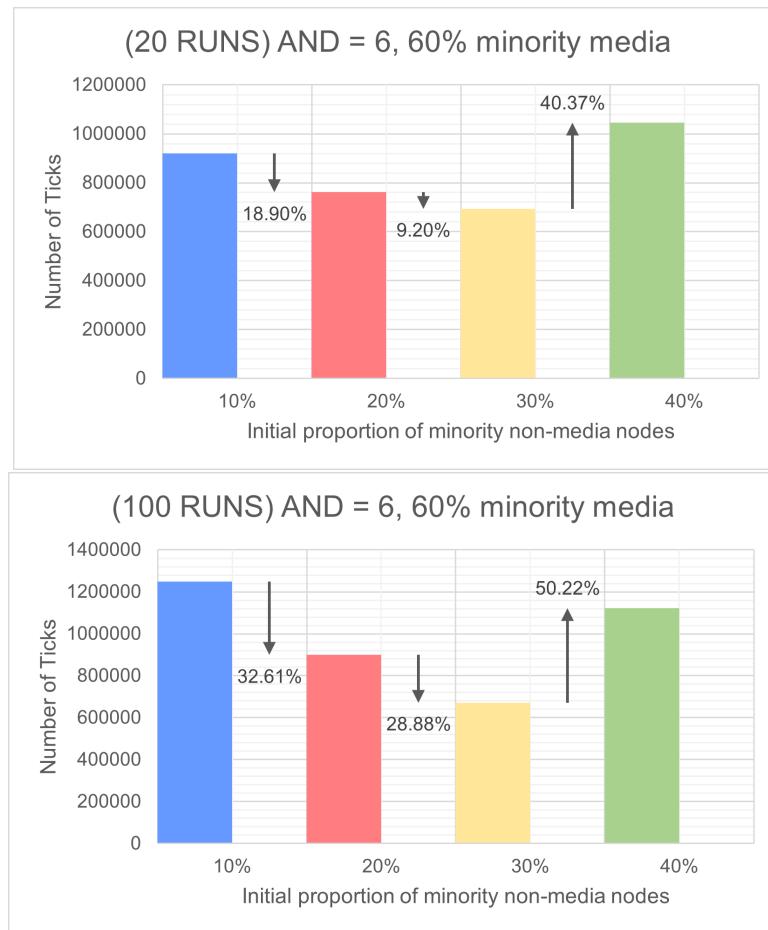
**70% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.38:** (7 minority : 3 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In Figure 4.38, the differences between the average numbers of ticks in the set of 20 runs have increased by 6.82% as the initial values for the minority non-media nodes were increased from 10% to 40%. Likewise, the differences between the average time values in the set of 100 runs have been raised by 88.55% as the initial values for the minority non-media nodes increased.

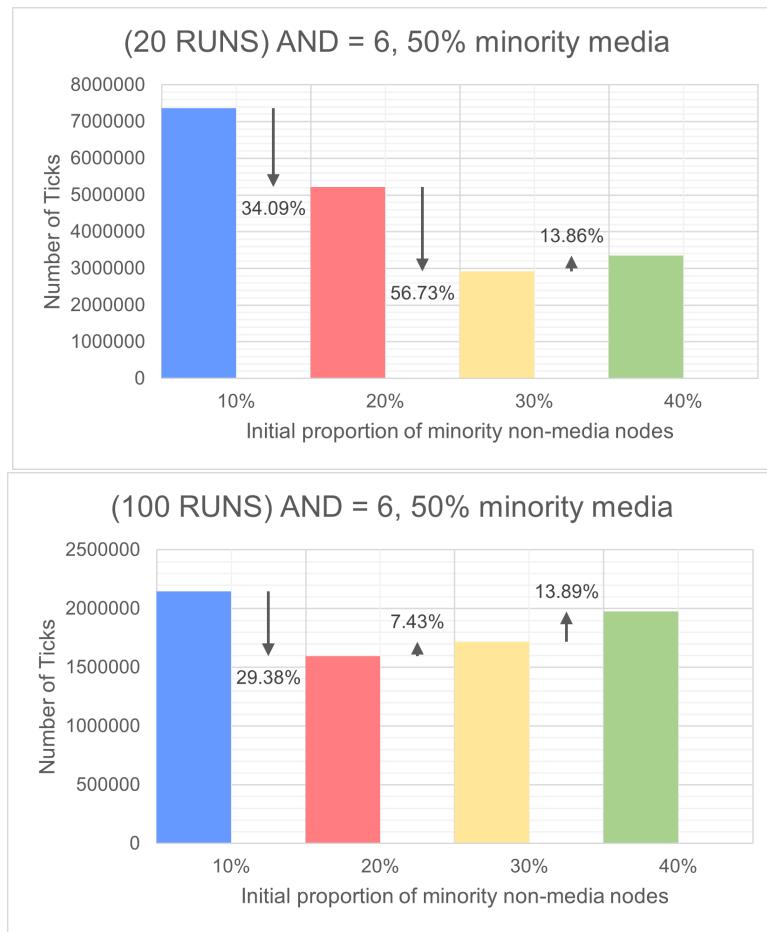
**60% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.39:** (6 minority : 4 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences in the average time values for the set of 20 runs in Figure 4.39 have decreased by 12.27% as the proportions of the minority non-media nodes increased. On the other hand, in the set of 100 runs, the differences in the average time values have increased by 11.27% with the increase in the proportion of minority non-media nodes.

**50% Minority media nodes with varying initial values of minority non-media nodes**



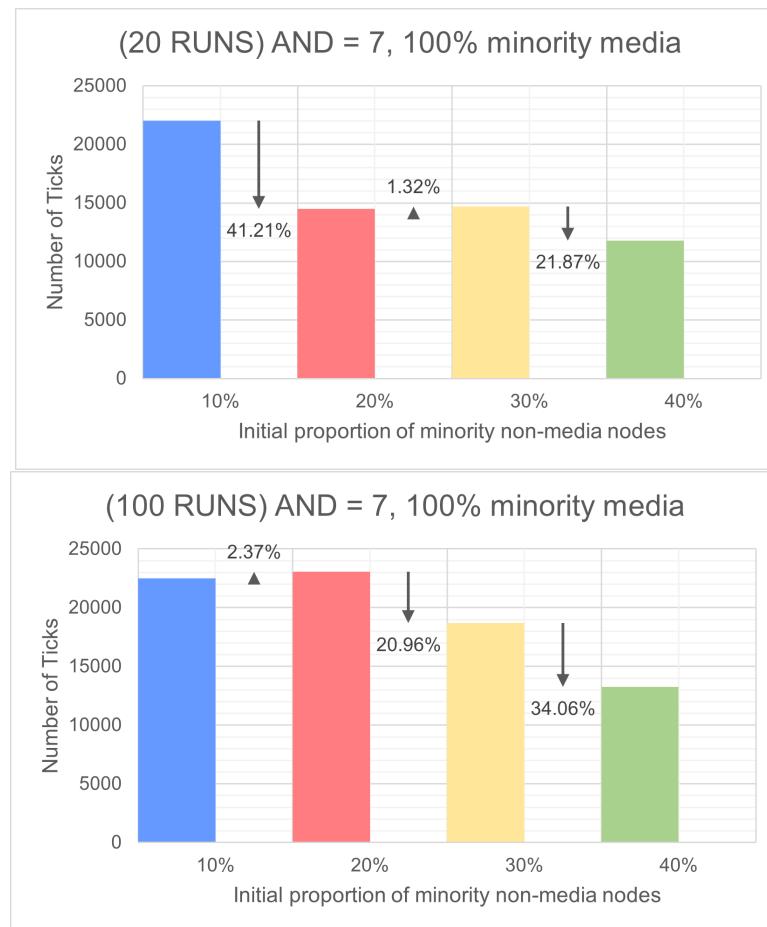
**Figure 4.40:** (5 minority : 5 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In the set of 20 runs from Figure 4.40, the differences in the average time values have been raised by 76.96% as the proportions of minority non-media nodes increased from 10% to 40%. The differences in average numbers of ticks for the set of 100 runs have also been increased by 8.15% with the increase in the proportions of minority non-media nodes.

### 4.2.2 AND value of 7

For this subsection, the AND value has been increased to 7. Still, the values for the media nodes have been set to 100%, 90%, 80%, 70%, 60%, and 50%. Also, the initial values for the minority non-media nodes have been set to 10%, 20%, 30%, and 40%.

#### 100% Minority media nodes with varying initial values of minority non-media nodes

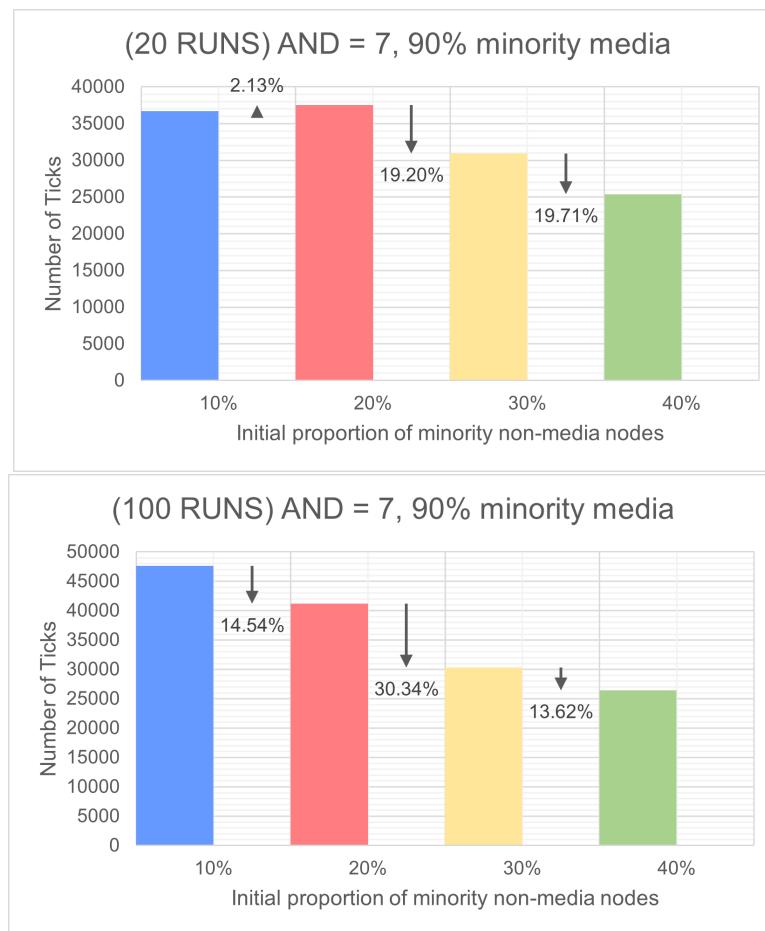


**Figure 4.41:** (10 minority : 0 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences in the average time values for the set of 20 runs in Figure 4.41 have increased by 61.76% with the proportions of minority non-media nodes grew from 10%

to 40%. Similarly, the differences in the average time values for the set of 100 runs have increased by 52.65% as the proportions of minority non-media nodes increased.

### 90% Minority media nodes with varying initial values of minority non-media nodes

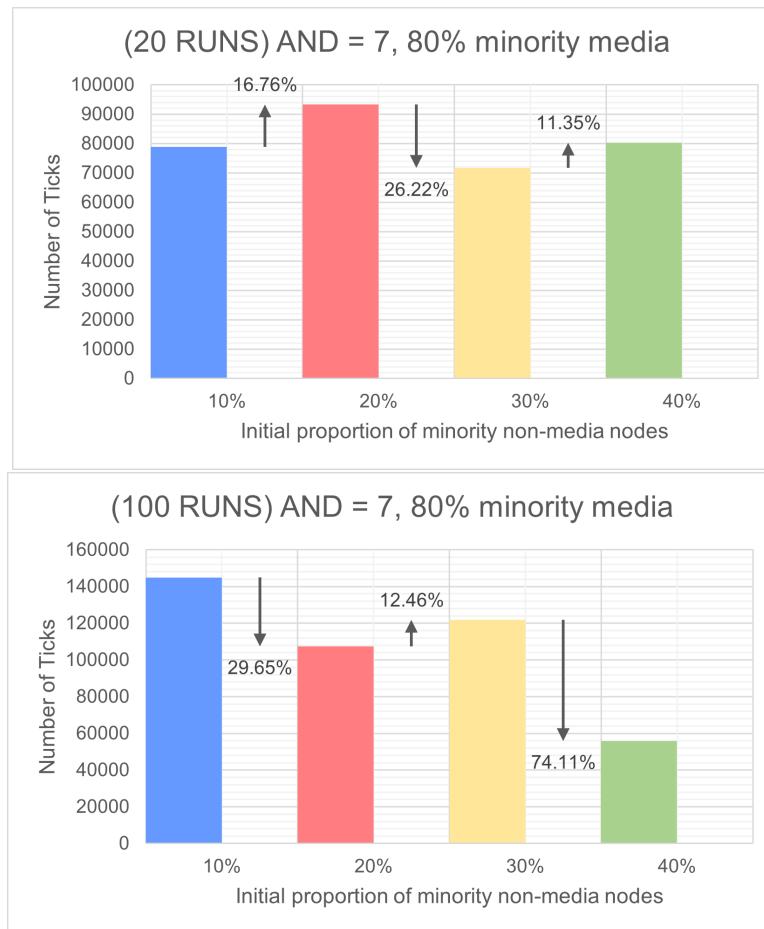


**Figure 4.42:** (9 minority : 1 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.42, the differences in the average time values for the set of 20 runs have increased by 36.78% as the proportions of minority non-media nodes have also increased. On the other hand, in the set of 100 runs, the differences in the average time values have increased by 58.5% as the proportions of minority non-media nodes have increased from

10% to 40%. Moreover, the number of increases in the differences of average time values was greater by one more difference in the set of 100 runs.

### 80% Minority media nodes with varying initial values of minority non-media nodes

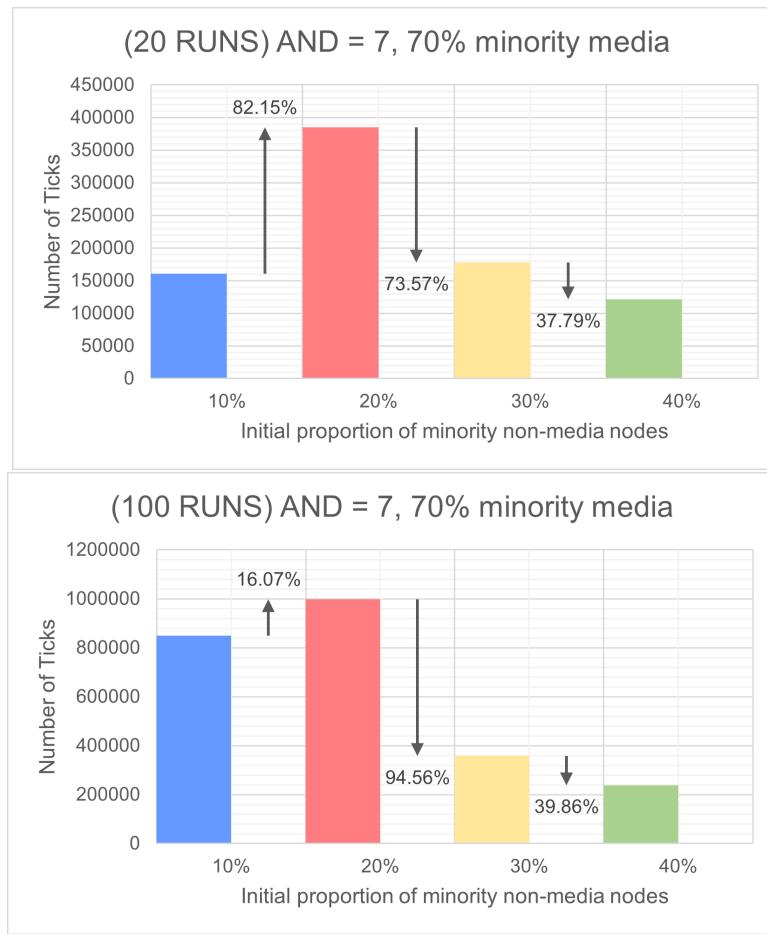


**Figure 4.43:** (8 minority : 2 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In Figure 4.43, the differences in the average time values in the set of 20 runs have decreased by 1.89% as the proportions of minority non-media nodes increased from 10% to 40%. For the set of 100 runs, the differences in the average time values have increased by 91.3% with the increase in the proportions of the minority non-media nodes. Additionally,

the number of increases in the differences of average time values was greater by one more difference in the set of 100 runs.

### 70% Minority media nodes with varying initial values of minority non-media nodes



**Figure 4.44:** (7 minority : 3 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.44, the differences in the average time values for the set of 20 runs have increased by 29.21% as the proportions of the minority non-media nodes increased. Similarly, the differences in the average time values for the set of 100 runs have also increased by 118.35% with the increase in the proportions of the minority non-media

nodes.

### 60% Minority media nodes with varying initial values of minority non-media nodes

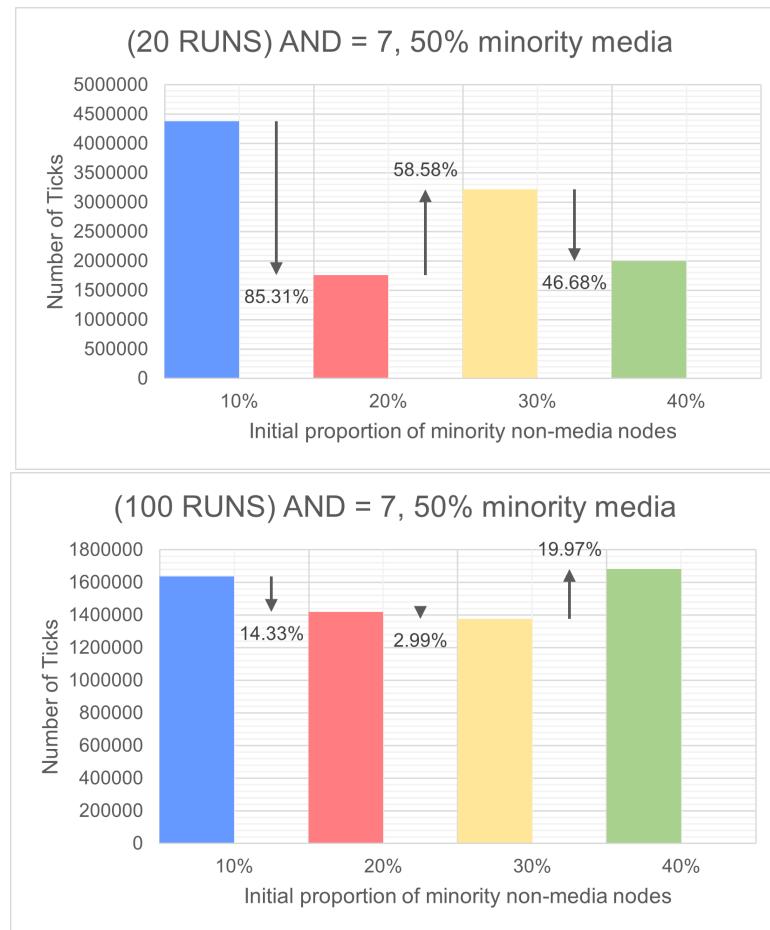


**Figure 4.45:** (6 minority : 4 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

For the set of 20 runs from Figure 4.45, the differences in the average time values have decreased by 32.71% as the proportions of minority non-media nodes increased. On the other hand, for the set of 100 runs, the differences in the average time values have increased by 50.06% for this proportion of minority media. Moreover, the number of increases in the differences of average time values was greater by one more difference in

the set of 100 runs.

### 50% Minority media nodes with varying initial values of minority non-media nodes



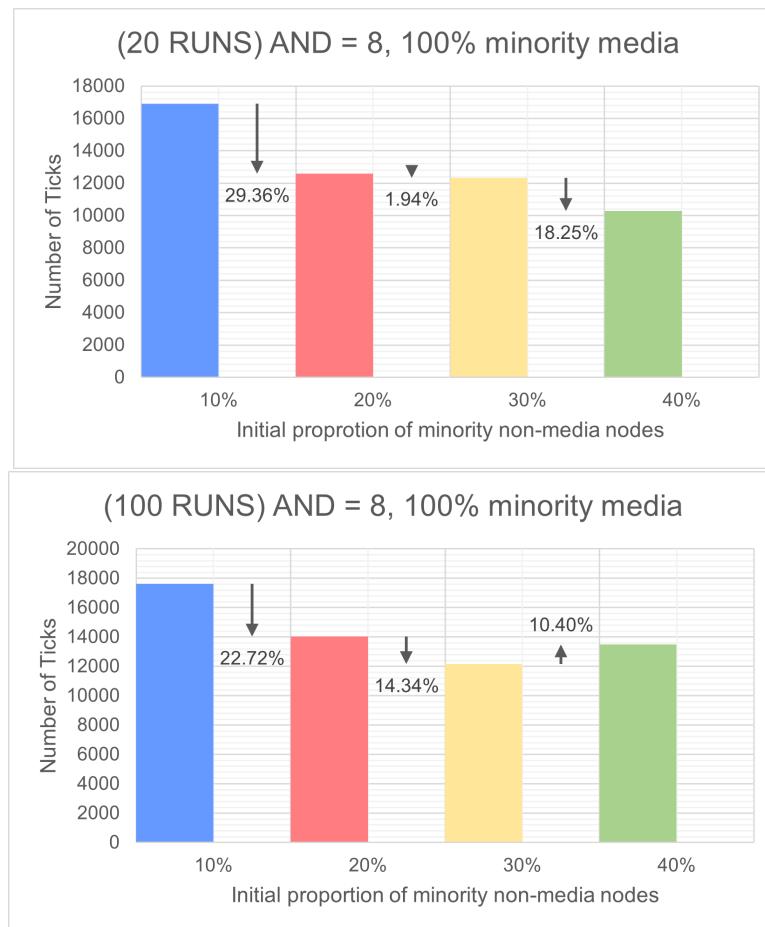
**Figure 4.46:** (5 minority : 5 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

For this proportion of minority media in Figure 4.46, the differences in the average time values have increased by 73.41% for the set of 20 runs, where the proportions of the minority non-media nodes have also increased from 10% to 40%. On the other hand, in the set of 100 runs, the differences in the average time values have decreased by 2.65% as the proportions of minority non-media nodes increased.

### 4.2.3 AND value of 8

In this subsection, the AND value is further increased to 8. Again, the values for the media nodes have been set to 100%, 90%, 80%, 70%, 60%, and 50%. Similarly, the initial values for the minority non-media nodes have been set to 10%, 20%, 30%, and 40%.

#### 100% Minority media nodes with varying initial values of minority non-media nodes

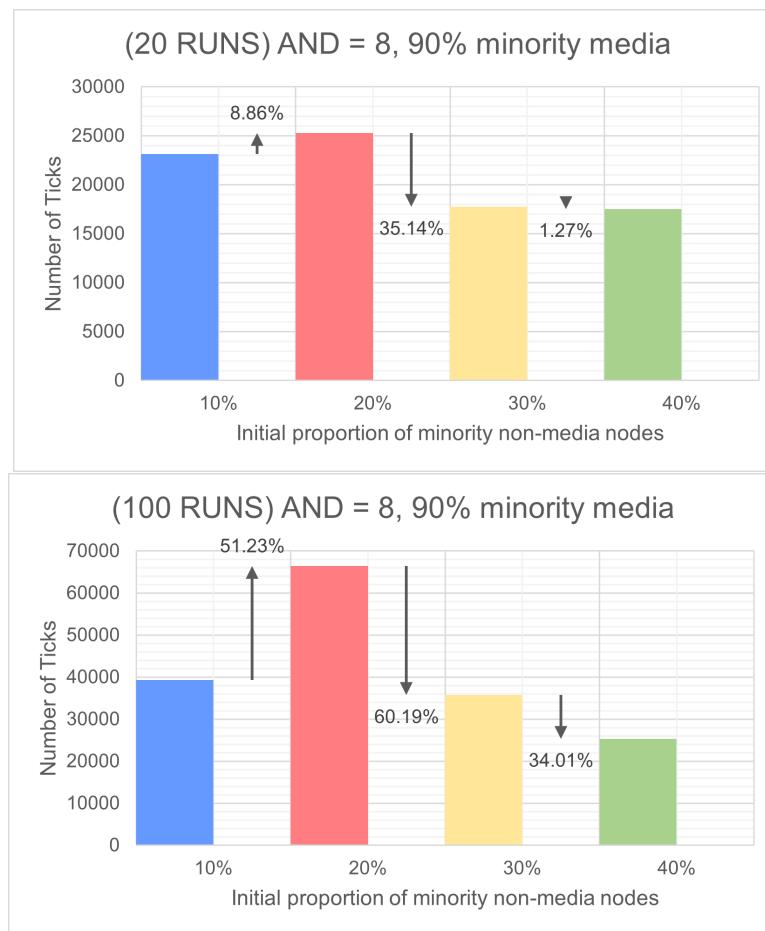


**Figure 4.47:** (10 minority : 0 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.47, the differences in the average time values for the set of 20 runs have increased by 49.55% as the proportions of minority non-media nodes have also increased.

On the other hand, in the set of 100 runs, the differences in the average time values have increased by 27.26% as the proportions of minority non-media nodes have increased from 10% to 40%. Additionally, the number of increases in the differences of average time values was greater by one more difference in the set of 20 runs.

### **90% Minority media nodes with varying initial values of minority non-media nodes**

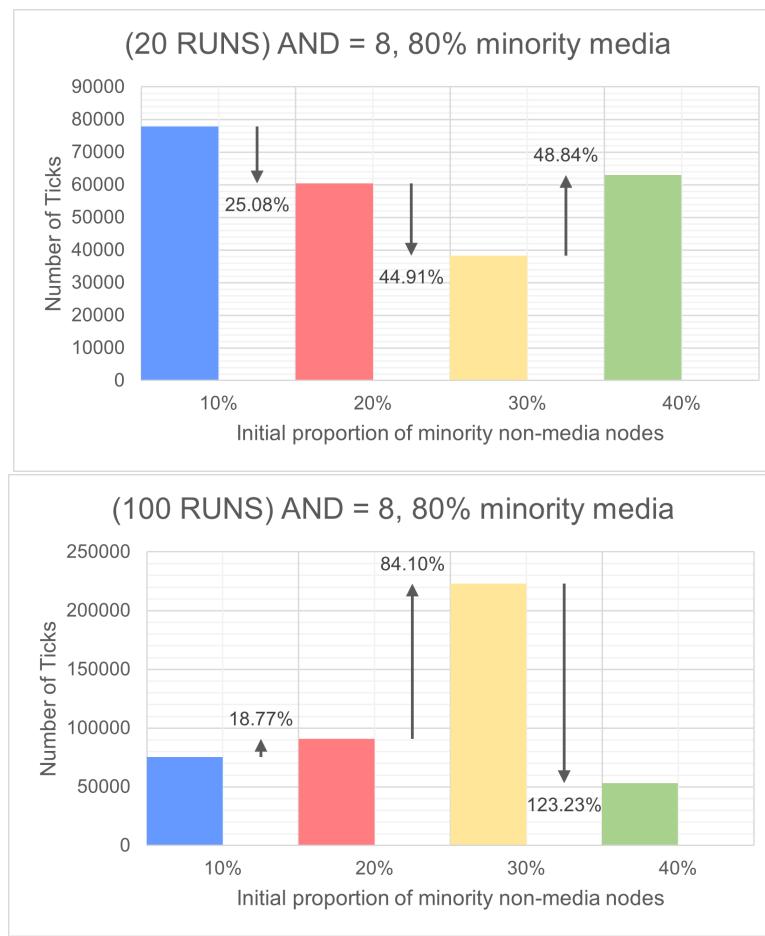


**Figure 4.48:** (9 minority : 1 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

For the set of 20 runs from Figure 4.48, the differences in the average time values have increased by 27.55% as the proportions of minority non-media nodes increased. Similarly

for the set of 100 runs, the differences in the average time values have increased by 43% for this proportion of minority media.

### 80% Minority media nodes with varying initial values of minority non-media nodes

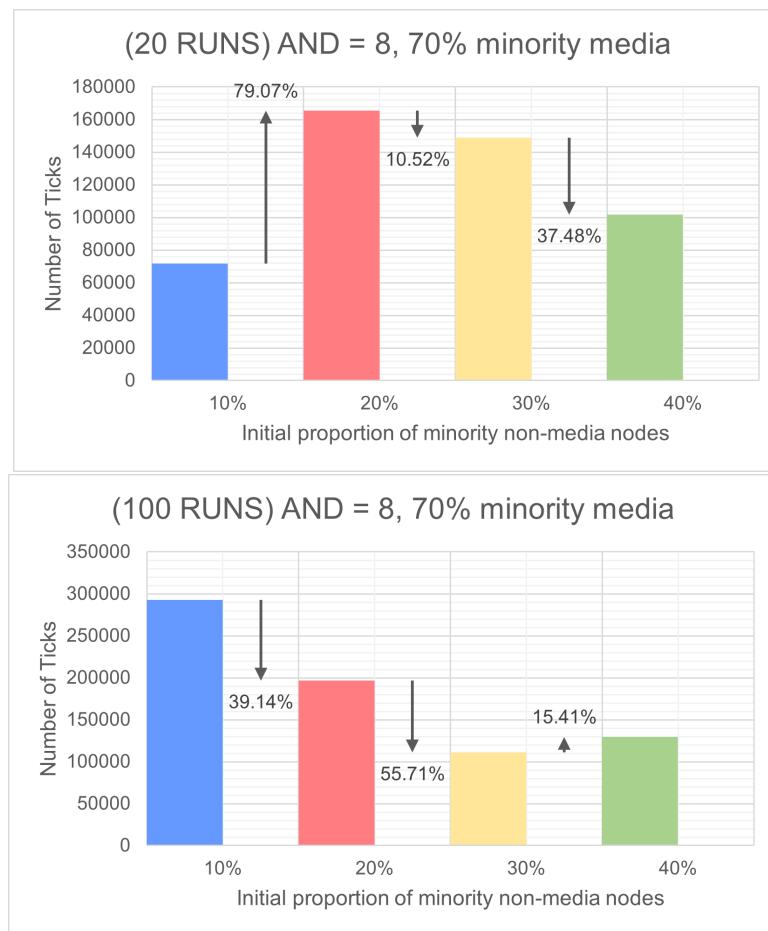


**Figure 4.49:** (8 minority : 2 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In Figure 4.49, the differences between the average numbers of ticks in the set of 20 runs have increased by 21.35% as the initial values for the minority non-media nodes were increased from 10% to 40%. Likewise, the differences between the average time values in

the set of 100 runs have been raised by 20.36% as the initial values for the minority non-media nodes increased. Moreover, the number of increases in the differences of average time values was greater by one more difference in the set of 20 runs.

### 70% Minority media nodes with varying initial values of minority non-media nodes

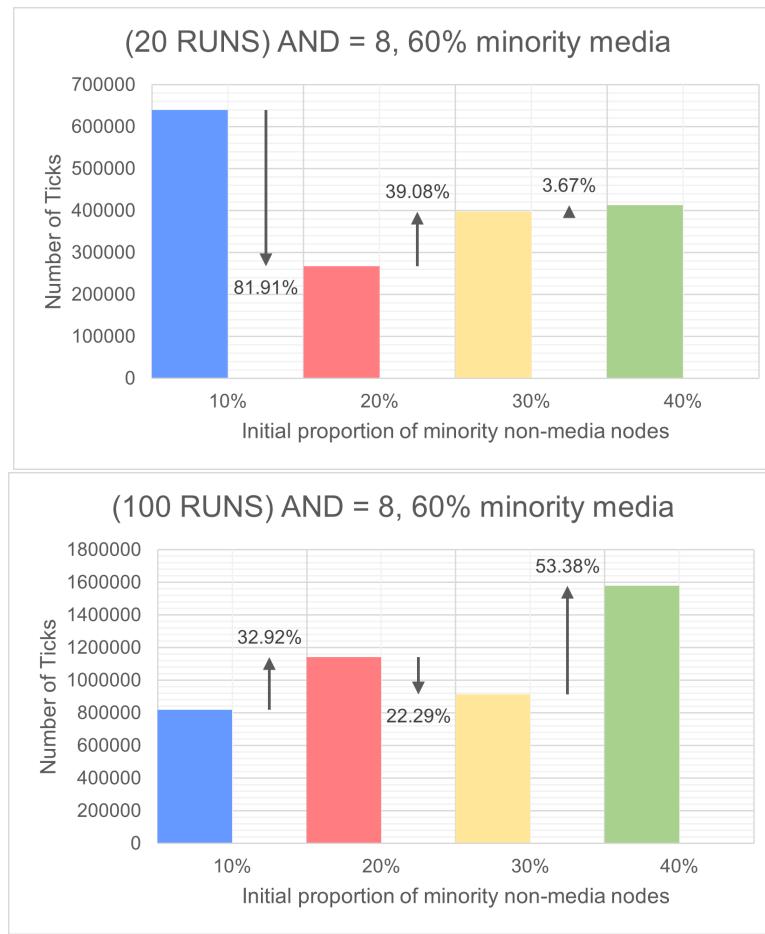


**Figure 4.50:** (7 minority : 3 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences between the average time values from Figure 4.50 have decreased by 31.07% as the initial values for the minority non-media nodes were increased from 10% to 40% in the set of 20 runs. For the set of 100 runs, the differences between the average

time values have also increased by 79.44% as the initial values for the minority non-media nodes were increased.

### 60% Minority media nodes with varying initial values of minority non-media nodes

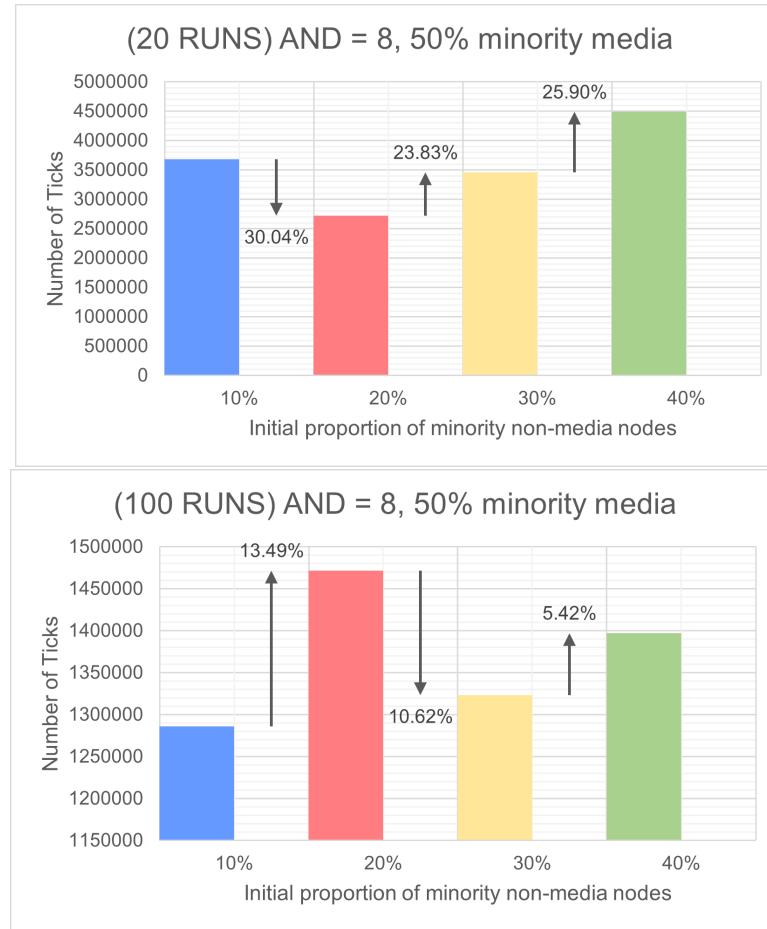


**Figure 4.51:** (6 minority : 4 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In the set of 20 runs from Figure 4.51, the differences in the average time values have increased by 39.16% as the proportions of minority non-media nodes increased from 10% to 40%. On the other hand, the differences in average numbers of ticks for the set of 100 runs have decreased by 64.01% with the increase in the proportions of minority

non-media nodes.

### 50% Minority media nodes with varying initial values of minority non-media nodes



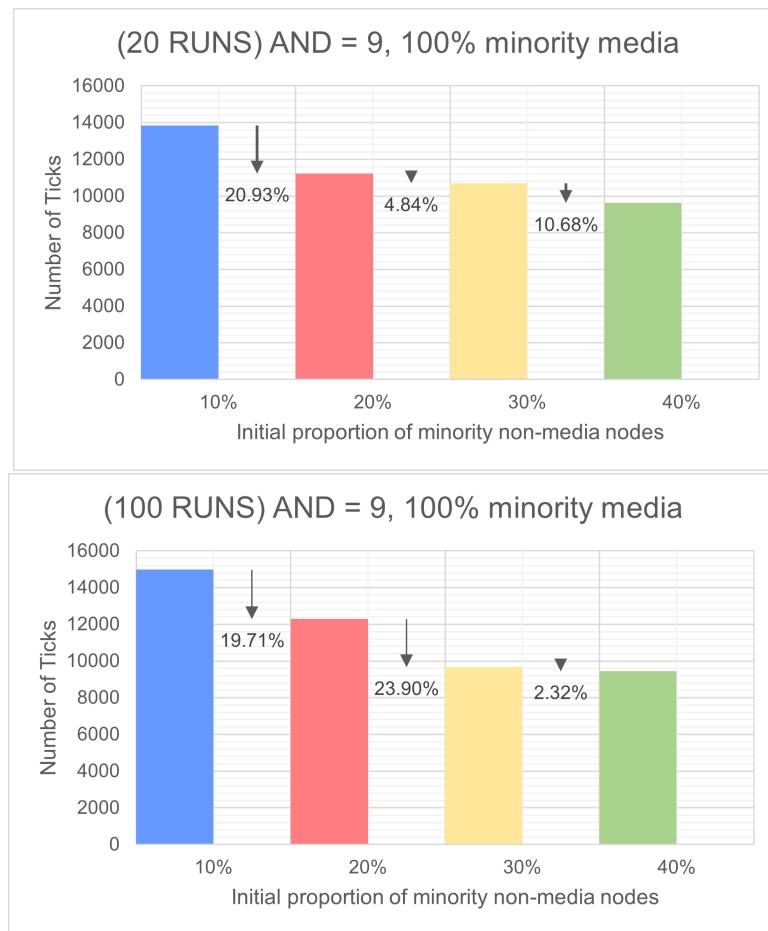
**Figure 4.52:** (5 minority : 5 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.52, the differences in average time values, for the set of 20 runs, have increased by 19.69% as the initial proportions of minority non-media have increased from 10% to 40%. Similarly, in the set of 100 runs, the differences in the average time values have decreased by 8.29% as the proportions of minority non-media nodes increased.

#### 4.2.4 AND value of 9

For this subsection, the AND value is, again, increased to 9. The values for the media nodes have been set to 100%, 90%, 80%, 70%, 60%, and 50%. Similarly, the initial values for the minority non-media nodes have been set to 10%, 20%, 30%, and 40%.

##### 100% Minority media nodes with varying initial values of minority non-media nodes

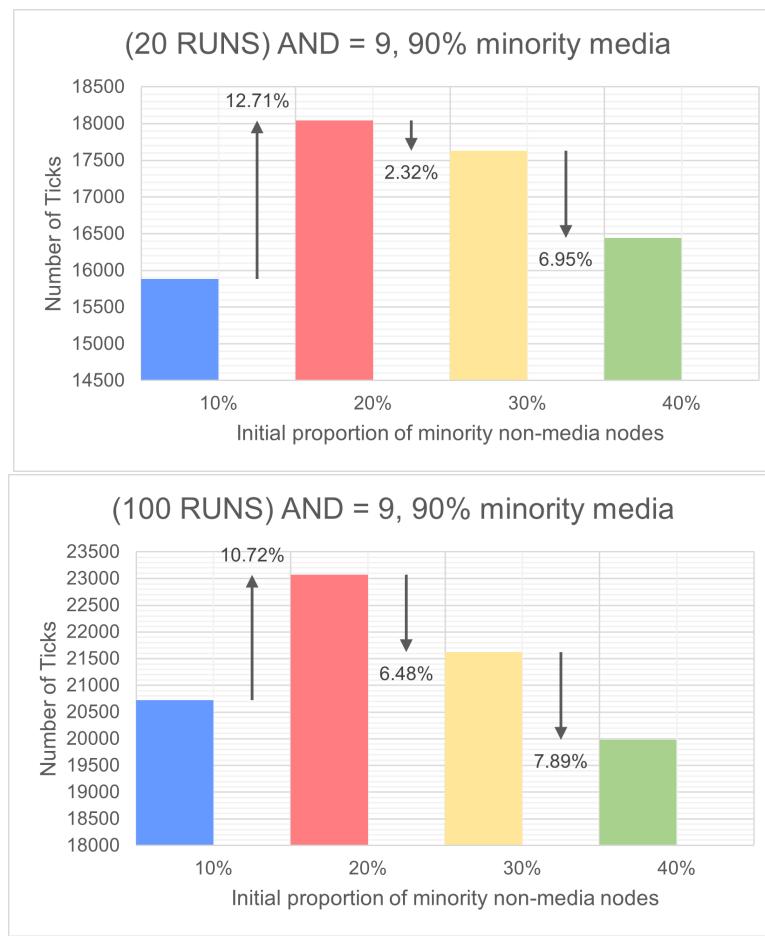


**Figure 4.53:** (10 minority : 0 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In Figure 4.53, the differences in the average time values in the set of 20 runs have decreased by 17.61% as the proportions of minority non-media nodes increased from 10%

to 40%. For the set of 100 runs, the differences in the average time values have increased by 45.93% with the increase in the proportions of the minority non-media nodes.

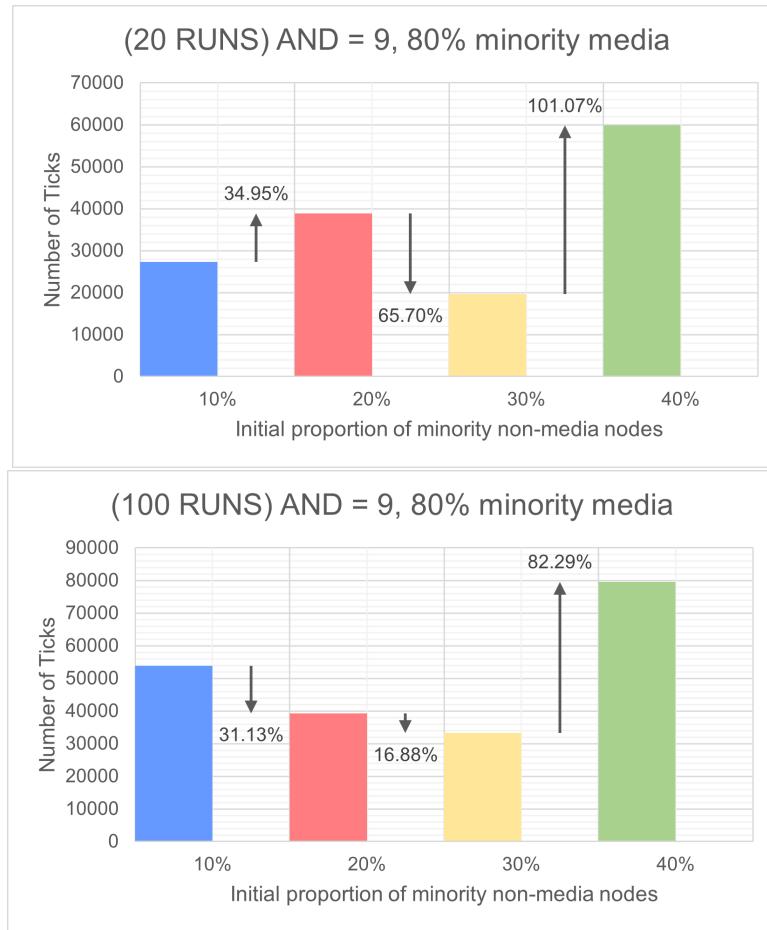
### 90% Minority media nodes with varying initial values of minority non-media nodes



**Figure 4.54:** (9 minority : 1 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences in the average time values for the set of 20 runs in Figure 4.54 have decreased by 3.44% as the proportions of the minority non-media nodes increased. On the other hand, in the set of 100 runs, the differences in the average time values have increased by 3.65% with the increase in the proportion of minority non-media nodes.

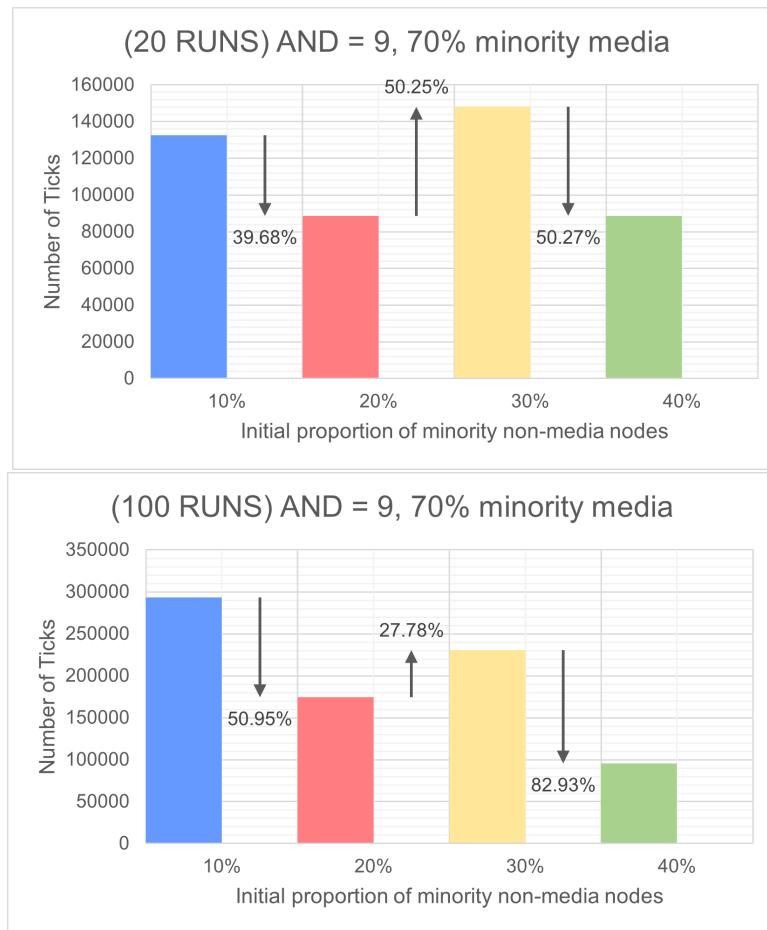
### 80% Minority media nodes with varying initial values of minority non-media nodes



**Figure 4.55:** (8 minority : 2 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.55, the differences between the average numbers of ticks in the set of 20 runs have decreased by 70.32% as the initial values for the minority non-media nodes were increased from 10% to 40%. On the other hand, the differences between the average time values in the set of 100 runs have decreased by 34.28% as the initial values for the minority non-media nodes increased. Moreover, the number of increases in the differences of average time values was greater by one more difference in the set of 100 runs.

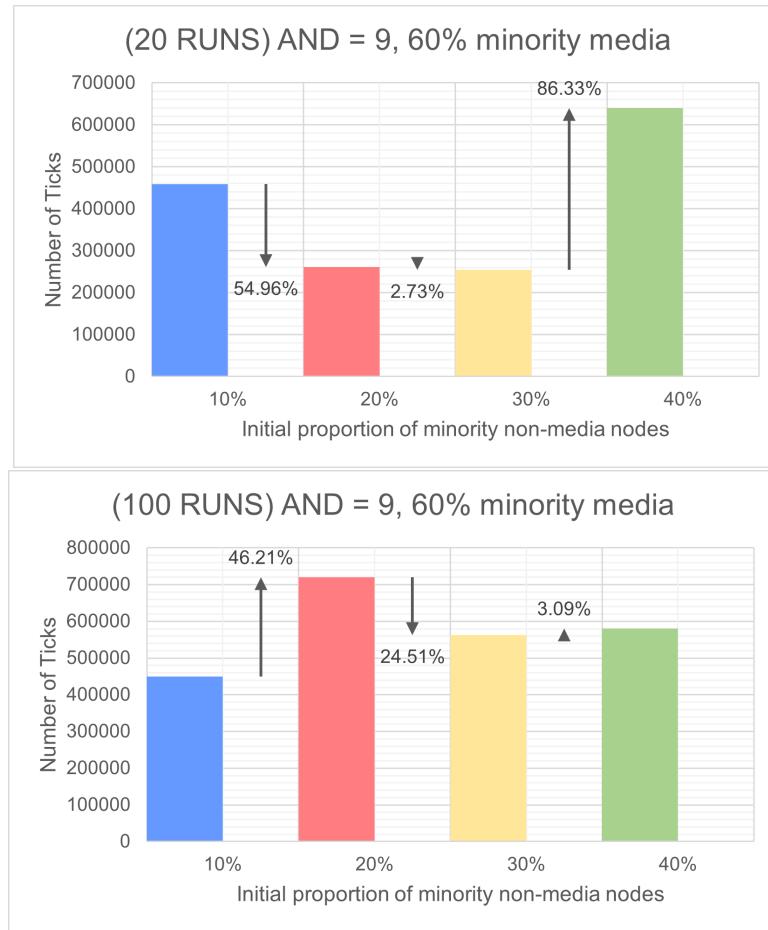
**70% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.56:** (7 minority : 3 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

For the set of 20 runs from Figure 4.56, the differences in the average time values have increased by 39.7% as the proportions of minority non-media nodes increased. On the other hand, for the set of 100 runs, the differences in the average time values have increased by 106.1% for this proportion of minority media.

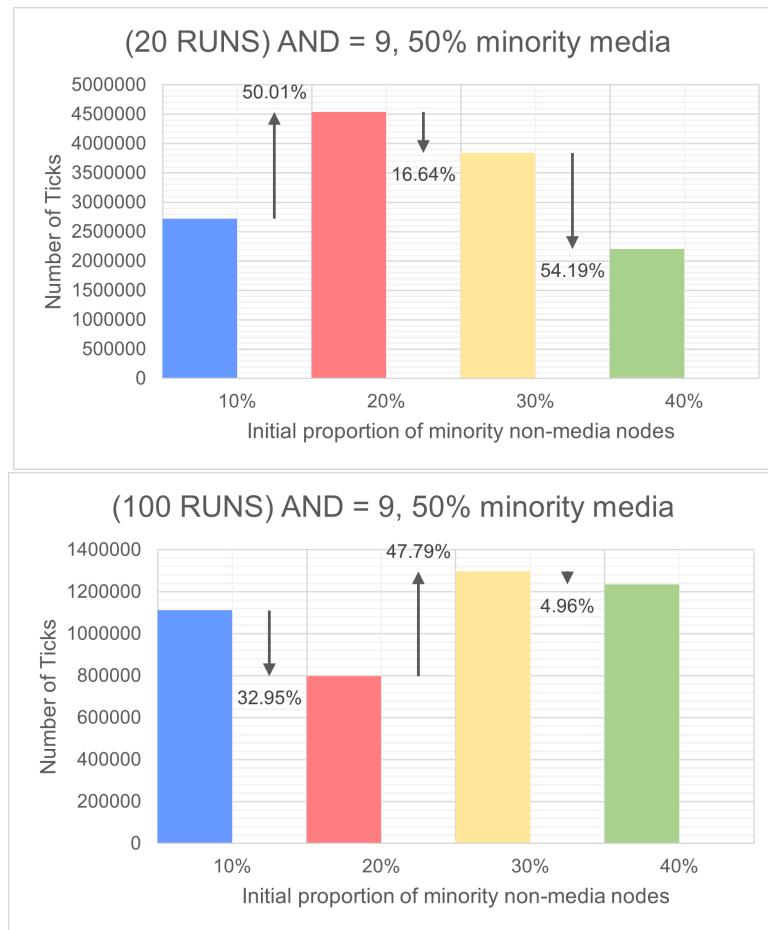
**60% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.57:** (6 minority : 4 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences in the average time values for the set of 20 runs in Figure 4.57 have decreased by 28.64% with the proportions of minority non-media nodes grew from 10% to 40%. Similarly, the differences in the average time values for the set of 100 runs have decreased by 24.79% as the proportions of minority non-media nodes increased. Additionally, the number of increases in the differences of average time values was greater by one more difference in the set of 20 runs.

**50% Minority media nodes with varying initial values of minority non-media nodes**



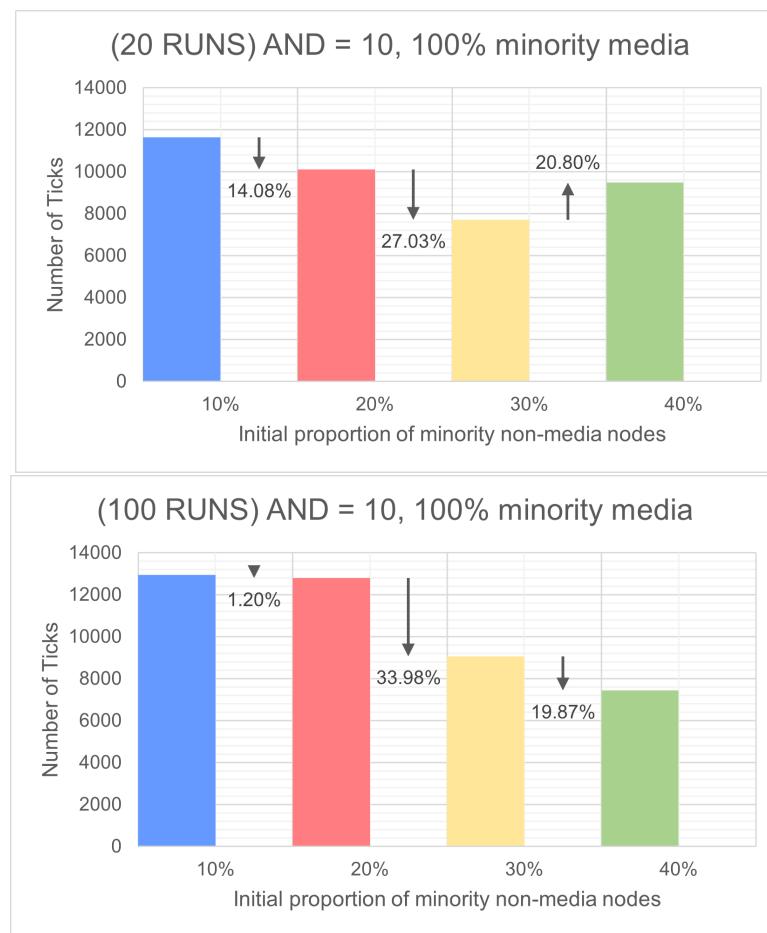
**Figure 4.58:** (5 minority : 5 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In Figure 4.58, the differences between the average time values in the set of 20 runs have increased by 20.82% as the initial values for the minority non-media nodes were increased. The differences between the average time values in the set of 100 runs have decreased by 9.88% as the initial values for the minority non-media nodes increased from 10% to 40%.

#### 4.2.5 AND value of 10

In this subsection, the AND value is increased to 10. The values for the media nodes have been set to 100%, 90%, 80%, 70%, 60%, and 50%. Also, the initial values for the minority non-media nodes have been set to 10%, 20%, 30%, and 40%.

##### 100% Minority media nodes with varying initial values of minority non-media nodes

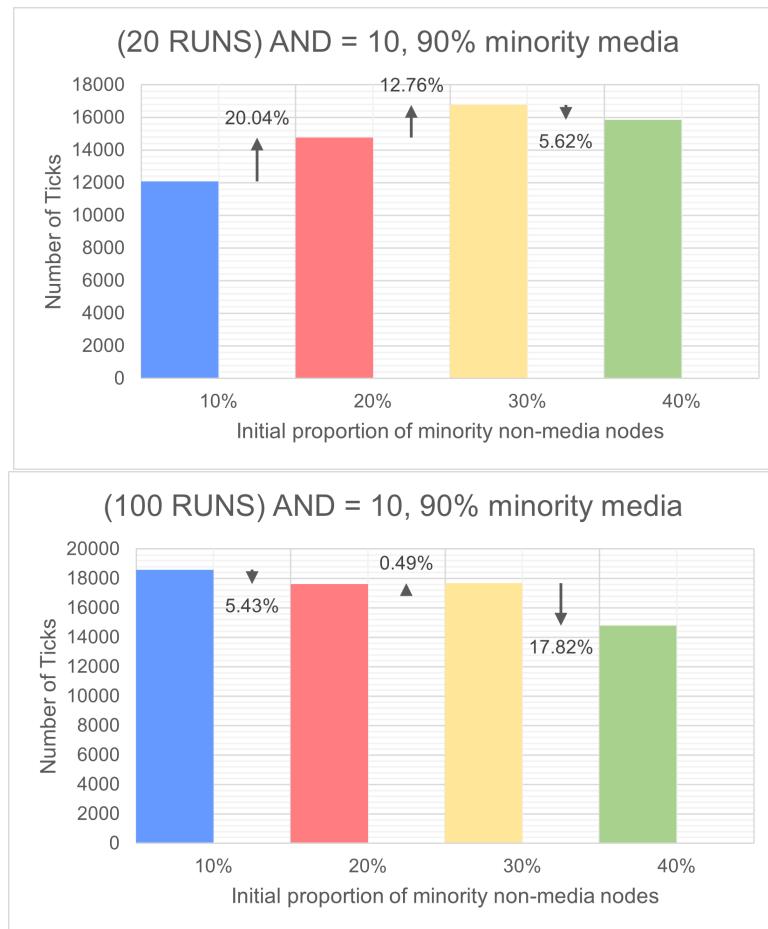


**Figure 4.59:** (10 minority : 0 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.59, the differences between the average time values in the set of 20 runs have increased by 20.31% as the initial values for the minority non-media nodes were

increased from 10% to 40%. Moreover, the differences between the average time values in the set of 100 runs have increased by 55.05% as the initial values for the minority non-media nodes also increased. Also note that the number of increases in the differences of average time values was greater in the set of 100 runs.

### 90% Minority media nodes with varying initial values of minority non-media nodes

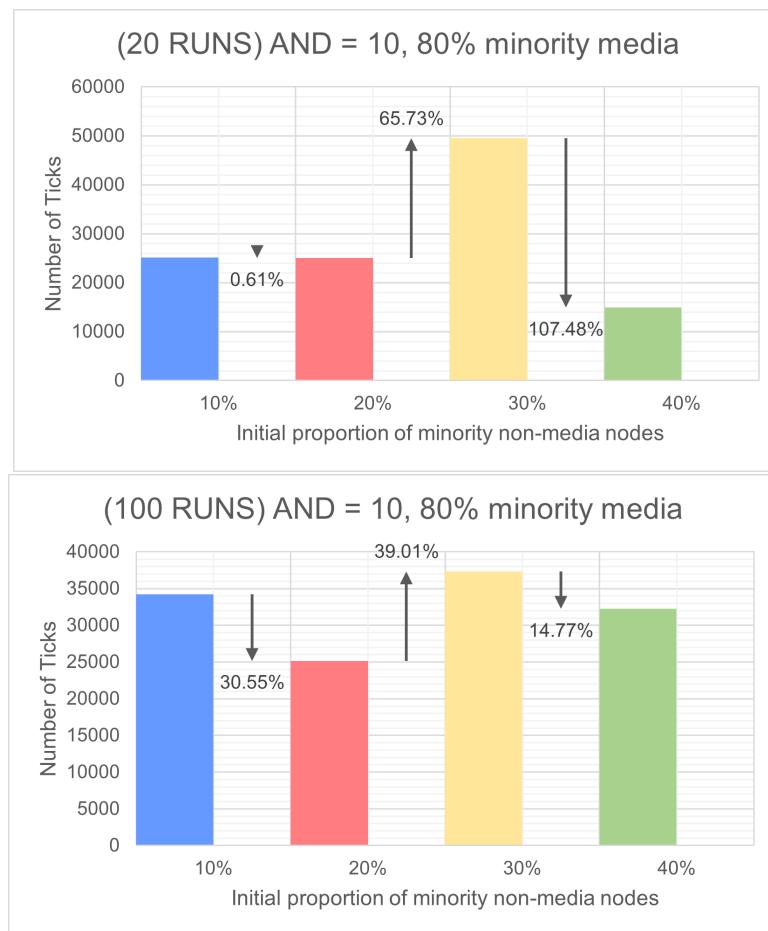


**Figure 4.60:** (9 minority : 1 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

For the set of 20 runs from Figure 4.60, the differences in the average time values have decreased by 27.18% as the proportions of minority non-media nodes increased. For the

set of 100 runs, the differences in the average time values have increased by 22.76% for this proportion of minority media. Moreover, the number of increases in the differences of average time values was greater in the set of 100 runs.

### 80% Minority media nodes with varying initial values of minority non-media nodes

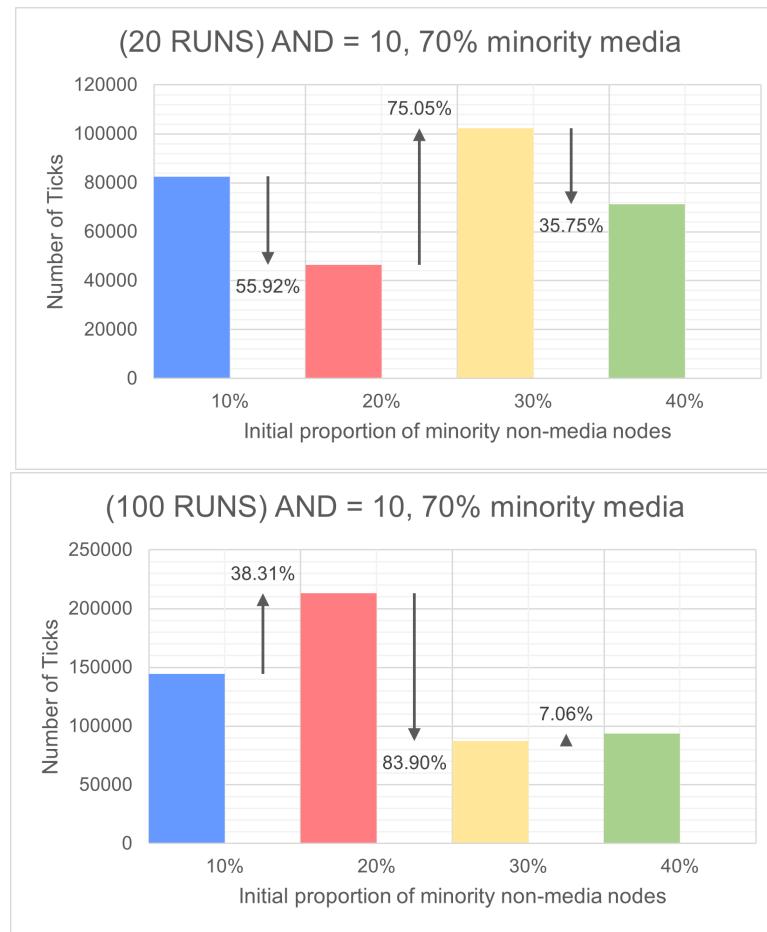


**Figure 4.61:** (8 minority : 2 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

In Figure 4.61, the differences in the average time values in the set of 20 runs have decreased by 42.36% as the proportions of minority non-media nodes increased. For the set of 100 runs, the differences in the average time values have increased by 6.31% with

the increase in the proportions of the minority non-media nodes from 10% to 40%.

### 70% Minority media nodes with varying initial values of minority non-media nodes

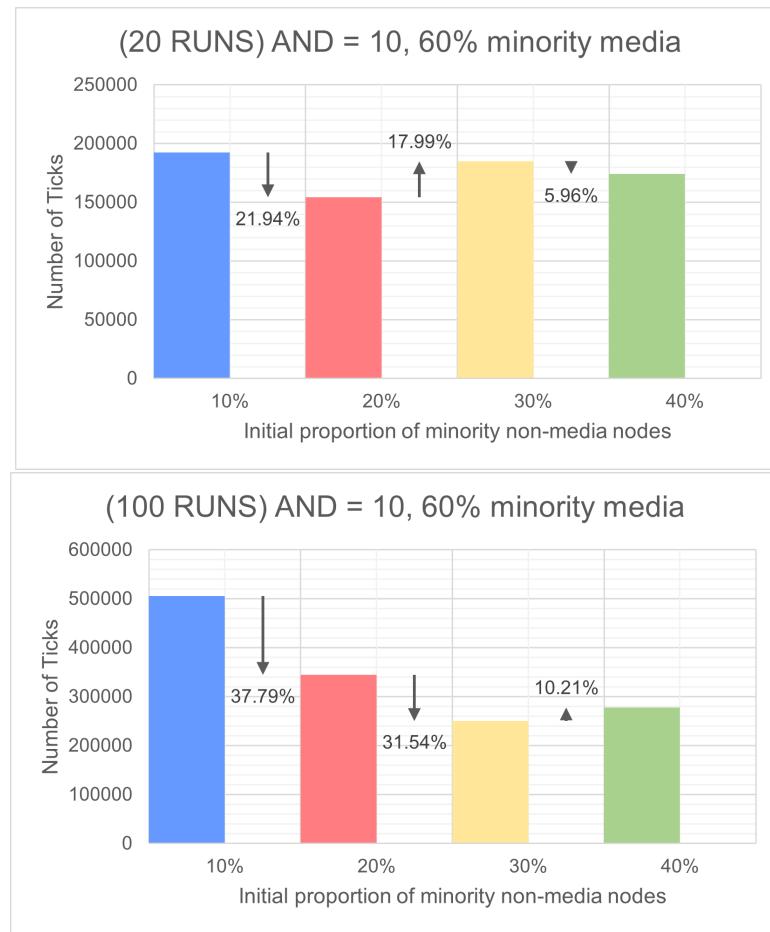


**Figure 4.62:** (7 minority : 3 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

The differences in the average time values for the set of 20 runs in Figure 4.62 have increased by 16.62% with the proportions of minority non-media nodes grew from 10% to 40%. Similarly, the differences in the average time values for the set of 100 runs have increased by 38.53% as the proportions of minority non-media nodes increased. Additionally, the number of increases in the differences of average time values was greater

by one more difference in the set of 20 runs.

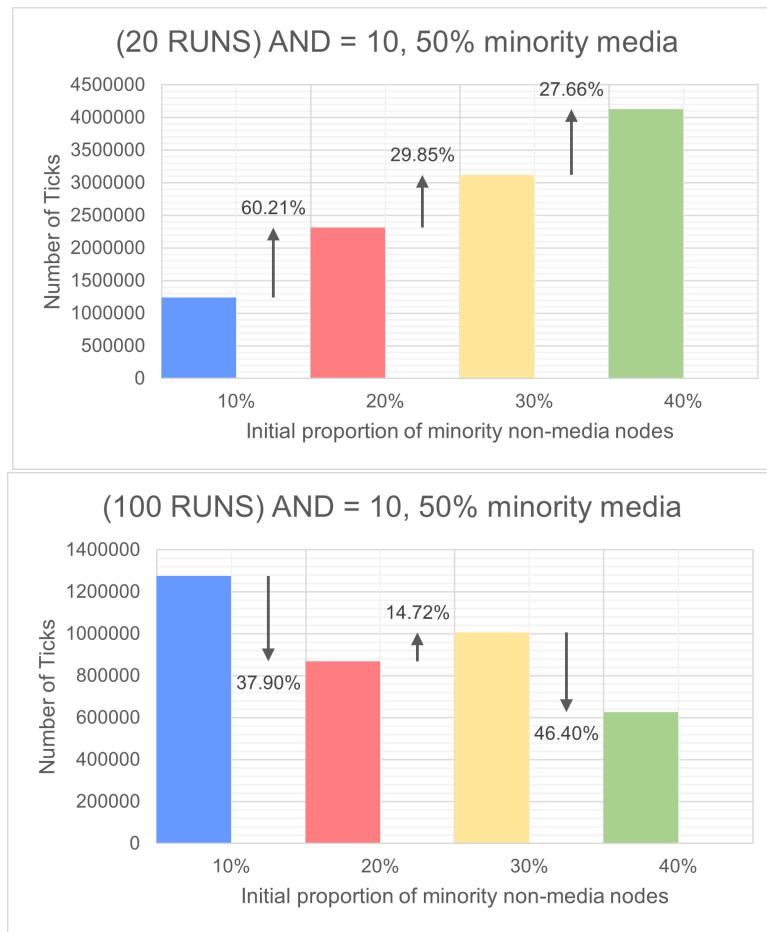
### 60% Minority media nodes with varying initial values of minority non-media nodes



**Figure 4.63:** (6 minority : 4 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

For the set of 20 runs from Figure 4.63, the differences in the average time values have increased by 9.91% as the proportions of minority non-media nodes increased. On the other hand, for the set of 100 runs, the differences in the average time values have increased by 59.12% for this proportion of minority media.

**50% Minority media nodes with varying initial values of minority non-media nodes**



**Figure 4.64:** (5 minority : 5 majority) Percentage differences of the average ticks in the sets of 20 runs (first graph) and 100 runs (second graph).

From Figure 4.64, the differences in average time values, for the set of 20 runs, have decreased by 117.72% as the initial proportions of minority non-media have increased from 10% to 40%. On the other hand, in the set of 100 runs, the differences in the average time values have decreased by 69.58% as the proportions of minority non-media nodes increased. Moreover, the number of increases in the differences of average time values was greater by two more differences in the set of 100 runs.

### 4.3 Summary of the Best Combinations

Varying proportions of minority and majority media affect the spreading of minority opinion differently. Coincidentally, the AND value that has provided the most favorable outcomes for the minority opinion was the highest value of 10. For this study, the value of AND ranges specifically from six to ten.

Media Effects Model with 10% media nodes (Best combinations for 100 nodes)			
Ratio of media nodes (minority : majority)	Initial ratio of non-media nodes (minority : majority)	AND	Average ticks (after 100 runs)
10 : 0	40 : 60	10	7 435
9 : 1	40 : 60	10	14 795
8 : 2	20 : 80	10	25 166
7 : 3	30 : 70	10	87 067
6 : 4	30 : 70	10	250 786
5 : 5	40 : 60	10	627 428

**Table 4.33:** (100 runs) Summary of the best combinations that ensures the success of the minority opinion from the previous tables.

An AND value of 10 has provided the quickest growth of the minority opinion for all proportions of media and non-media nodes. Three of the six combinations have 40 minority : 60 majority as the initial proportion of minority non-media nodes that has provided the least average running time. Moreover, the combination that has provided the lowest average time value, when there were majority media present, is with a proportion of 90% minority media nodes, a proportion of 40% minority non-media nodes, and an AND value of 10 (14 795 ticks).

In comparison with the previous study of Alvarez-Galvez [1] where their version of the media effects model has implemented a preferential attachment network, this study has made use of spatial network, specifically a random geometric graph, to implement the

AND parameter. The increase in the number of links has assisted the minority opinion to reach and interact with other nodes. Specifically, the minority media nodes can influence more non-media nodes into switching their preferences to the minority opinion; thus, flipping the situation of the perceived majority and minority opinions.

The advantage of having high connectivity for the minority media nodes has also become its downfall when this feature was given to the majority media nodes. There were certain features that guaranteed the success of minority opinion spreading, which included higher values of AND, and coincidentally, more links for randomly chosen nodes in the network. These features have become the barriers which leads to the loss of the minority opinion, once that these characteristics have been given to the majority media nodes.

In other words, whatever leverages that the minority media nodes may currently have, would eventually also become an advantage for the majority media nodes granted that their proportions were reversed.

The minority opinion still has a chance to win with the presence of majority media, given that the value of AND is higher than five and the proportion of the minority media does not fall under 50% of the total number of media nodes. Once the proportions of the media nodes are reversed, then all conditions that previously gave convenience to the minority opinion would now be considered as problems for its successful dissemination.

## 4.4 2022 Philippine Presidential Elections

According to the official results of the national elections, the newly elected president of the Republic of the Philippines won with a grand total of 31 million votes [25, 23, 28]. The trailing runner-up comes in second at about 15 million votes; approximately 31% of a difference from the top-ranking presidential candidate [25, 28]. Considering their history of competition last 2016 elections, which yielded an estimate of 0.64% difference in their total number of votes [24, 17], the winner for this year's presidential elections was then in the "minority", and is now the perceived "majority", as established by the recent official polls.

The results of this study that closely resembled the outcome of the elections is

from the set of 100 runs, with a combination that has a proportion of 50% minority media nodes, along with an initial proportion of 10% minority non-media nodes, and an AND value of 6.

For the comparison with the results of the study, the "minority opinion" would represent the winning aspirant for the 2022 presidential elections, while the "majority opinion" would represent the presidential candidate that finished second in the national elections. An assumption was made that both parties would have had the same number of social media platforms, where they have personally uploaded their political stances, campaigns, and timely updates for the public to peruse; and that both have attended the same number of televised presidential debates and interviews, which can also then be simulcasted through the broadcasting networks' social media platforms. These factors would serve as the 50-50 ratio of the media nodes present within the network. An AND value of 6 does not necessarily assign nodes with many links, but it still guarantees the success of minority opinion spreading. This value would now represent the reach (i.e., number of connections) of both "opinions" in the network.

The initial proportions of 10% minority and 90% majority non-media nodes symbolizes the individuals supporting the "minority opinion" and "majority opinion" mentioned earlier. The number of links have remarkably helped with the spread of the "minority opinion", which can be interpreted in real life as minority media representatives who possess more connections than the others, where they can efficiently persuade more individuals to side with the minority. Moreover, the average time value supplied by this combination of parameters is 2 145 987 ticks. Recall that the official campaigning period for national positions in the Philippines is only 90 days before the official election date. When this number of ticks is treated as seconds, the time can then be converted to approximately 25 days in real life, which is a value from the results of this study that parallels with the narrative of the 2022 Philippine national elections.

# Chapter 5

## Conclusion and Recommendations

The presence of majority media has a significant effect on the dissemination of minority opinion, with the gravity of the outcome depending on the proportion of majority media currently present in the network. Particularly, a proportion of 90% minority media nodes along with another proportion of 40% minority non-media nodes provided the least average running time in this study. Higher values of AND guaranteed the success of minority opinion spreading; given that the nodes with higher number of links are in favor of the minority opinion as well, and that the proportion of minority media present does not fall under half of the total number of media nodes. Specifically, the best AND value is 10.

Through media alone, i.e., traditional, broadcast and/or online, the result of the 2022 national elections was comparable to one set of parameters: a proportion of 50% minority media nodes, with an initial proportion of 10% minority non-media nodes, and an AND value of 6. The average time of 2 145 987 ticks that this combination of parameters has supplied, when converted to 25 days, roughly resembles the official campaigning period for the national positions.

Additional parameters such as committed agents and trolls would perhaps give a more life-like model to represent the development of the elections. Moreover, analyzing the performances of such agents during campaigns and rallies, whether within the official time period or not, is also highly suggested. It is also recommended to try the model on a bigger scale to determine whether it can even come close to replicating such a historical occasion.

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# Appendix A

## Tables for 100% Minority Media Nodes:

### 10 minority media - 0 majority media (20 runs)

Table A.1: 20 runs with 10% media nodes: 10 minority - 0 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	28550	9017	5802	12766
2	12937	52119	9915	5267
3	18481	43393	9800	20612
4	12474	11865	17842	14648
5	19111	25422	13751	8749
6	12774	27925	12106	15959
7	40173	11197	13139	4895
8	70546	23938	9790	5985
9	16454	81104	5800	18642
10	21244	7390	8010	7735
11	15459	20400	19202	15491
12	16595	12719	45963	29405
13	25079	27163	40816	17689
14	16831	13123	8184	17607
15	15905	33930	11782	12873
16	7079	27525	22212	15856

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	20016	11664	18480	28194
18	23450	15662	9797	6633
19	11099	9115	20371	4571
20	32225	18986	34118	7040

Table A.2: 20 runs with 10% media nodes: 10 minority - 0 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	28723	21331	15956	11772
2	32852	20234	4380	21762
3	9009	9763	14842	12092
4	34912	8407	6920	11376
5	11983	24343	35377	5923
6	20254	30702	24081	8506
7	12688	9811	17792	5310
8	21126	14364	10952	4232
9	40908	10840	11968	13511
10	31182	9859	15847	26795
11	28633	11001	8728	15280
12	12551	11200	11927	5601
13	14859	7439	8657	9082
14	7140	36407	18145	26369
15	16387	7129	12381	3322
16	43066	9048	8207	24847
17	11727	6397	11264	17255
18	39197	13912	21329	3405

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	13194	11935	17272	5052
20	9743	15629	17556	4226

Table A.3: 20 runs with 10% media nodes: 10 minority - 0 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	14619	11747	15637	41675
2	13069	14017	22111	10627
3	11979	9079	16764	2862
4	10997	17950	6996	7235
5	8224	13263	9229	6020
6	32690	7117	3893	6344
7	31085	24682	21740	5005
8	9141	8079	9529	14339
9	13722	5099	3927	7925
10	24453	7035	7157	11241
11	27567	22502	8321	21354
12	9748	18748	30140	23647
13	27572	3766	3332	2259
14	8396	8925	11395	6935
15	6396	13946	21207	6087
16	14020	11460	2861	3896
17	32540	22036	4489	7679
18	22697	8144	12551	5959
19	5397	12740	27505	10777

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	13707	11135	7851	3524

Table A.4: 20 runs with 10% media nodes: 10 minority - 0 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	9260	19578	5957	3849
2	4655	3115	9978	8574
3	17114	6527	18765	8383
4	33661	11177	9388	9418
5	9929	17610	6512	2741
6	18643	20758	8760	4485
7	5758	9017	20881	6789
8	7644	7926	7069	13264
9	21616	11946	10038	3252
10	15077	13961	6123	14047
11	10171	12724	15091	5261
12	12534	8455	3666	3495
13	11430	5112	6512	9120
14	12619	27435	13761	10276
15	6171	4086	12426	3437
16	28647	5444	2698	21000
17	7208	10596	15842	19613
18	8728	6925	10504	17566
19	6618	10862	10088	6631
20	29526	11277	19844	21039

Table A.5: 20 runs with 10% media nodes: 10 minority - 0 majority, AND = 10, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	14485	6893	4237	7213
2	12200	4076	3430	12416
3	5032	18541	6965	9837
4	14121	9047	12129	2675
5	14793	13434	6375	5844
6	12198	19466	4052	7629
7	10755	7650	7786	19239
8	7479	19959	5489	16305
9	12699	5936	9266	13082
10	8605	4522	4128	3879
11	9570	21123	8485	10287
12	7841	5812	8047	7495
13	14472	10781	17912	19441
14	7147	6419	7715	3844
15	11394	6743	7834	6023
16	22875	9971	14222	30304
17	10212	6016	4439	3656
18	17131	14477	3209	1948
19	14205	2531	11883	5163
20	5755	8938	6538	3643

## Appendix B

### Tables for 90% Minority Media Nodes: 9 minority media - 1 majority media (20 runs)

Table B.1: 20 runs with 10% media nodes: 9 minority - 1 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	47626	19459	78670	56494
2	35572	24413	32427	33971
3	51938	104986	47754	10914
4	51841	11764	13633	26975
5	24195	8088	59685	137395
6	44211	15031	29130	19573
7	133968	11601	16300	4229
8	24198	18010	14788	30388
9	118165	407850	34153	93266
10	257553	21587	25642	18726
11	11670	208578	54999	4651
12	21694	74331	25353	83235
13	10098	28978	16737	9643
14	87798	46928	305943	163213
15	13386	15962	38845	10077
16	18292	15303	23377	10762

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	60634	26431	29106	4831
18	21682	86648	124499	97998
19	29538	28108	18155	51776
20	49694	17975	76732	3881

Table B.2: 20 runs with 10% media nodes: 9 minority - 1 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	22689	95629	9683	6976
2	17122	24784	9632	53540
3	35829	9753	10408	9980
4	22548	20227	8396	4796
5	20346	17242	7092	2611
6	51431	19757	217574	79408
7	49008	132368	36599	66606
8	13694	24932	8182	50080
9	41941	170365	21081	33700
10	39942	23413	19103	56090
11	62477	7321	6902	19725
12	21032	38861	90329	15416
13	9874	28784	4826	35084
14	14415	32165	7894	8735
15	22123	18293	45027	16334
16	64345	39092	16317	6314
17	70531	11210	18135	8386
18	17937	16100	39413	8279

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	110906	10524	28170	15639
20	26036	9212	13854	9921

Table B.3: 20 runs with 10% media nodes: 9 minority - 1 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	26864	54389	26916	5825
2	10962	10900	14737	11501
3	21937	19245	10011	29050
4	33770	31784	12199	37112
5	8783	14165	7024	5587
6	9170	11917	22018	11301
7	18623	28893	13891	21268
8	29282	61238	5928	7004
9	13729	73726	6178	2284
10	80511	12716	8693	4130
11	25051	17713	38374	7608
12	7866	6660	14594	23134
13	34188	28438	4719	13025
14	18665	4135	53613	40564
15	43316	20622	35284	28818
16	40230	22687	11405	31417
17	12939	16217	15111	9439
18	8826	40381	7783	5166
19	44962	11268	17620	23320

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	13397	18888	28671	32759

Table B.4: 20 runs with 10% media nodes: 9 minority - 1 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	4884	9836	15083	39791
2	14112	28511	14394	34397
3	8126	13239	6517	7307
4	11231	14211	14212	9719
5	22258	7082	20280	4875
6	33728	5047	17105	9863
7	15823	22508	18360	12604
8	24744	6314	17062	7640
9	11750	16685	6266	26252
10	10541	30073	7541	4117
11	20747	31035	19715	19842
12	15690	16543	8898	26881
13	8749	14259	5924	13473
14	11095	3482	22978	9062
15	11807	24339	23013	21508
16	11213	19881	9372	22003
17	17126	31783	40879	8775
18	31252	26393	53360	21633
19	23255	8608	11406	20547
20	9558	30972	20172	8555

Table B.5: 20 runs with 10% media nodes: 9 minority -  
1 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	30785	28401	4795	30122
2	10188	4395	8301	10377
3	11834	5866	6056	21301
4	12207	13465	42276	26528
5	8778	19879	7669	2774
6	12978	27710	3108	42992
7	16819	6190	33595	10544
8	12205	5150	35069	12434
9	5925	6652	8146	20916
10	9704	6123	7906	15541
11	6157	24758	44588	3434
12	11618	30601	19338	7990
13	17600	7944	16708	9694
14	13057	16040	8359	40117
15	4611	14078	23070	3597
16	11872	6612	10365	13646
17	13612	10320	24286	9116
18	16979	18123	9150	4054
19	6962	12056	6501	23034
20	7494	30785	16076	8816

## Appendix C

### Tables for 80% Minority Media Nodes: 8 minority media - 2 majority media (20 runs)

Table C.1: 20 runs with 10% media nodes: 8 minority - 2 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	100055	516623	318673	17043
2	24637	90036	22342	18709
3	266298	47650	94219	13769
4	382796	36982	20436	24414
5	191857	660554	356104	159345
6	58777	182500	144841	459419
7	19395	62445	26209	25916
8	23567	345756	94177	306324
9	36700	34958	28957	36203
10	89541	128523	188512	84896
11	163329	14666	52734	22817
12	35998	846851	14857	22967
13	491026	197359	247851	26673
14	349432	59009	96437	119932
15	68635	14074	20271	585331
16	27830	485973	21764	105652

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	434335	672379	29701	45706
18	57967	81466	37403	6766
19	62541	391058	122243	152138
20	286110	699622	74814	17347

Table C.2: 20 runs with 10% media nodes: 8 minority - 2 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	70006	8892	411585	36550
2	17242	31531	39462	28932
3	15293	73614	28349	66394
4	21678	33082	18983	23867
5	22842	13396	49501	22803
6	48647	5943	4840	66444
7	114409	55275	21505	15099
8	17933	46870	44931	20143
9	78337	7676	86615	75854
10	31002	18347	23686	23343
11	135290	26649	123144	9316
12	35666	35314	7280	20958
13	197637	97971	8496	739457
14	64912	78598	198593	33857
15	20572	66244	86994	27396
16	409445	22193	36974	181480
17	175641	297781	162981	3703
18	19409	15227	36236	133639

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	42258	32827	23650	5680
20	39690	899111	20079	71571

Table C.3: 20 runs with 10% media nodes: 8 minority - 2 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	38471	127504	7050	10490
2	332189	215372	29763	12090
3	10771	20970	21537	11374
4	19198	21965	32226	24808
5	46546	16467	62614	21156
6	174815	24784	31255	5001
7	16859	55201	10631	10845
8	51785	18960	11315	10738
9	34115	35164	33976	119742
10	66201	62687	81421	6483
11	45238	53923	63822	85829
12	20607	18753	30923	385499
13	12341	85001	7836	343492
14	389512	43940	13740	24850
15	160644	71023	51541	27269
16	50800	18509	31842	48431
17	24678	29939	29227	38251
18	9786	28791	93576	8933
19	38950	17771	115428	11659

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	12662	242697	6173	53831

Table C.4: 20 runs with 10% media nodes: 8 minority - 2 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	37917	8290	15770	33447
2	11984	7631	14080	54008
3	14839	21796	33482	18775
4	25212	27656	14489	17201
5	20231	21732	13220	5078
6	40475	12946	49342	496660
7	53356	10960	23886	10981
8	17553	30932	18261	7892
9	50216	43021	11784	15858
10	24175	47231	24125	136892
11	28017	14850	22839	11583
12	16371	6156	14404	106437
13	33761	39797	9856	130732
14	23445	56557	9479	15360
15	29871	9345	14729	12656
16	67931	44103	15844	15986
17	13657	21456	37729	12905
18	7870	156072	8522	10315
19	12758	14025	28891	40053
20	16866	183435	12491	43936

Table C.5: 20 runs with 10% media nodes: 8 minority -  
2 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	15658	15443	42661	1681
2	66484	33202	126102	4857
3	47506	33133	330202	19092
4	18162	24706	107253	10205
5	9818	10356	9227	9572
6	17583	10118	5746	3602
7	29615	19358	13585	7469
8	27839	19050	13982	5857
9	27673	108569	8539	12383
10	15592	44742	25836	14549
11	30722	11841	47360	8949
12	9591	18966	45308	6694
13	12038	9165	22089	21357
14	9820	10425	20261	2986
15	16680	11665	26930	5290
16	15615	51712	51844	9282
17	48918	13414	25523	112960
18	25093	10892	24462	13545
19	14958	12640	20047	20128
20	43935	30815	22973	7420

## Appendix D

### Tables for 70% Minority Media Nodes: 7 minority media - 3 majority media (20 runs)

Table D.1: 20 runs with 10% media nodes: 7 minority - 3 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	83700	690104	101274	57005
2	3264464	878090	449947	252958
3	59476	61236	312005	81255
4	71907	197589	51917	210236
5	251772	151835	182115	18580
6	221418	896705	398083	220387
7	73463	826980	25332	149859
8	19433	147609	2647300	430300
9	233003	542904	410757	647376
10	317589	2143976	1094060	220664
11	98986	58690	160214	417378
12	804937	246272	812437	116885
13	124462	30793	690440	100381
14	217650	1268164	544229	202391
15	36342	43630	71852	2230764
16	842671	106805	208052	150663

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	191401	297593	18851	131438
18	105873	1086940	180955	857044
19	44894	179750	84245	136482
20	238602	27959	488466	192669

Table D.2: 20 runs with 10% media nodes: 7 minority - 3 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	237074	135098	34036	36998
2	287624	142089	185230	169234
3	61885	155152	14750	103993
4	37639	50322	2177756	106631
5	79816	206610	136927	82042
6	65452	19015	24226	484476
7	130097	19468	28852	101705
8	102470	55936	34519	31629
9	111336	554762	119861	36670
10	37272	1055640	29107	56954
11	35219	1796478	9254	279586
12	272356	1691263	129922	46787
13	304413	1237215	69173	44091
14	503982	87800	64845	39430
15	185555	121700	37566	274883
16	537748	120565	16026	24751
17	79707	65149	344821	11945
18	89743	20422	32594	123694

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	34422	82332	48444	223010
20	21335	80827	19734	148383

Table D.3: 20 runs with 10% media nodes: 7 minority - 3 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	28169	58242	70937	12009
2	31533	409536	74875	28155
3	105743	70222	451405	98378
4	85773	50779	56317	227243
5	189699	78695	116359	8120
6	178736	110451	323168	536481
7	70317	109508	75791	78006
8	32118	46080	9049	242845
9	20308	34948	23224	8359
10	27233	880124	87523	32034
11	85848	285173	31053	128752
12	97762	67365	69359	16679
13	141485	50044	57407	71273
14	29028	594574	692265	15412
15	79632	52225	153369	10774
16	19424	29543	20438	35354
17	53050	40621	566491	302793
18	21895	13281	40422	45835
19	58627	16094	30856	9534

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	76020	308195	25149	128249

Table D.4: 20 runs with 10% media nodes: 7 minority - 3 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	230949	19749	442343	33142
2	8903	21408	15618	21565
3	577472	158424	68738	15193
4	29121	38301	34764	852481
5	44695	26862	22468	146658
6	83528	58238	154252	21323
7	45208	19697	34232	48638
8	264401	598191	122880	49381
9	29655	128882	9599	19775
10	349968	10265	11727	7886
11	38531	43117	79107	29751
12	91394	202907	683319	129002
13	137608	34487	423307	19498
14	111303	57779	417708	8681
15	9963	73806	18246	10150
16	46363	54833	29967	16579
17	154408	31498	11396	10316
18	216842	82495	312446	172464
19	148515	22492	14153	8538
20	30740	88929	55472	150949

Table D.5: 20 runs with 10% media nodes: 7 minority -  
3 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	35207	40798	16103	17406
2	106491	11207	84276	97012
3	37152	39705	204762	109480
4	47743	60036	590067	5352
5	44871	55507	15642	5731
6	365372	67299	17416	22311
7	75573	36944	11247	46985
8	14447	55277	22418	83392
9	14407	12346	47377	7391
10	22498	35261	31090	11942
11	200293	20515	168963	9402
12	238472	149181	56053	59640
13	144038	28549	34250	41153
14	128614	13736	88791	8820
15	10509	12181	31459	493161
16	27999	12673	498009	116461
17	36700	77896	7971	161061
18	24875	97145	93770	51139
19	34680	46232	11055	37520
20	41163	57079	15652	40353

## Appendix E

### Tables for 60% Minority Media Nodes: 6 minority media - 4 majority media (20 runs)

Table E.1: 20 runs with 10% media nodes: 6 minority - 4 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	1374612	263279	1154320	141677
2	127100	347742	923120	1090786
3	239090	1010339	68080	20525
4	2648490	1136864	3270279	127573
5	3192828	1002457	238469	32782
6	506556	3583738	14331	2646139
7	949979	338414	283904	2103534
8	174508	225814	67140	824017
9	203954	437839	390615	1157556
10	480632	313588	134864	31039
11	420070	122681	758548	693368
12	45559	265146	1353942	133488
13	2618109	52055	453676	1218142
14	607021	297178	1191072	2600751
15	491526	489220	192744	1050105
16	168612	996022	641150	1944711

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	41280	738468	238238	1471206
18	239028	168607	305068	2260277
19	1341255	34161	144950	31564
20	2521837	3392145	2053609	1318453

Table E.2: 20 runs with 10% media nodes: 6 minority - 4 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	60404	38388	182260	48509
2	644448	58058	2714051	330085
3	575399	760198	4764069	131934
4	3165438	136728	190827	72941
5	334408	2902299	526138	390228
6	3275668	1372169	670311	149567
7	2383253	306316	1380197	66202
8	170764	2380313	125556	1204919
9	1648738	2806509	77011	152890
10	58046	297423	3199099	1413044
11	657933	1827480	1791103	474243
12	415585	45789	49410	1291516
13	122496	307679	250936	676364
14	455860	850369	90715	31565
15	136711	636192	3266679	969671
16	1233221	276211	2259637	38223
17	45467	41650	812721	77656
18	199850	961613	189337	127720

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	169594	591689	1545238	3385852
20	248663	861469	42127	127420

Table E.3: 20 runs with 10% media nodes: 6 minority - 4 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	263684	295864	286240	33261
2	61579	240305	160011	742840
3	418151	51201	35526	1536847
4	196323	103007	611153	272525
5	847178	101638	978337	22724
6	100369	215768	123830	631506
7	106051	28006	45477	832790
8	75697	277475	594292	744928
9	309130	371252	261313	39731
10	98786	112579	690112	82627
11	36966	56463	55760	947894
12	633256	348840	1523203	94003
13	570331	101036	167889	309507
14	2155086	339015	374041	51457
15	2277743	280387	95043	366933
16	916983	1448592	83517	106589
17	42266	393524	563804	720211
18	2364566	330704	100514	436395
19	54238	57316	1153995	207016

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	1267945	207330	59855	82082

Table E.4: 20 runs with 10% media nodes: 6 minority - 4 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	64839	48656	138787	58390
2	822465	221776	85215	90327
3	23675	31717	546241	50352
4	28244	267347	40162	2184246
5	17851	66954	194581	2536716
6	703029	86995	204352	333473
7	48149	143451	111680	455744
8	105544	81862	62928	46384
9	50249	28340	328343	96586
10	1067611	1265549	589136	1255656
11	358060	149946	479474	167725
12	138035	57445	183370	1638435
13	412469	75412	205397	44478
14	366200	154277	125825	210104
15	1674657	92316	154717	238207
16	176145	23837	408656	29843
17	63841	73596	70555	96715
18	131358	199308	624519	99032
19	59713	1902191	327567	3033492
20	2860536	247263	196076	123876

Table E.5: 20 runs with 10% media nodes: 6 minority - 4 majority, AND = 10, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	75330	14602	62386	15558
2	119778	24906	316448	50234
3	520566	21454	52421	980566
4	62519	175742	271730	24508
5	124475	17703	59237	11933
6	257958	415910	532131	97878
7	30152	118565	89934	489310
8	931069	63055	225396	6402
9	59057	42478	713848	35899
10	46757	129569	68847	58709
11	198121	105683	21085	16526
12	94788	174351	14525	93553
13	149380	45480	72349	6154
14	73891	34222	386721	192604
15	648621	26241	87905	77801
16	170877	139574	27831	106521
17	46549	425408	346885	232290
18	103632	97886	195847	113976
19	15761	136663	102099	7836
20	116245	875582	47387	862906

## Appendix F

### Tables for 50% Minority Media Nodes: 5 minority media - 5 majority media (20 runs)

Table F.1: 20 runs with 10% media nodes: 5 minority - 5 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	9918945	5973080	144390	3983854
2	1897523	1093139	878250	3964636
3	14352011	11405358	3043194	5227418
4	7834387	1682673	1809602	1257569
5	23521341	305255	1866963	3187513
6	21960772	14966929	916284	2676735
7	3891532	12534579	2772113	8448424
8	7846145	247308	55994	896458
9	3454599	10013193	8233674	97088
10	439891	10892036	867616	5177289
11	2820063	2358428	7738575	13277630
12	11968762	823429	691863	5688321
13	1697752	3635396	11808500	2911729
14	8685097	98315	1879765	2647950
15	6155520	18672609	1828123	424200
16	1879594	864070	1962749	2407661

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	13314576	228788	9585447	780387
18	1000697	1738213	97268	340413
19	4348324	6464836	1076264	2413860
20	388056	448979	1031832	1158723

Table F.2: 20 runs with 10% media nodes: 5 minority - 5 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	582395	731406	1408743	1279503
2	21683708	531053	1218115	2238888
3	379607	256906	12571043	59670
4	10215847	243244	349428	671091
5	6079551	1851519	1623658	2515324
6	412868	753272	514398	100736
7	1449446	3134594	101067	2408925
8	732888	2068386	1515291	5451234
9	1572715	2648971	4527204	653354
10	1257870	1268001	748469	3726774
11	3601394	2510550	3640214	514329
12	255316	203052	831250	306044
13	278828	342915	261635	30591
14	16191978	264886	573486	536250
15	164663	3563096	7963727	1008230
16	1716010	666551	3709595	1616817
17	3894683	548421	3748448	7279417
18	1480947	10710670	3115951	8280746

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	1249896	138175	4960840	363814
20	14388834	2772355	10992740	967900

Table F.3: 20 runs with 10% media nodes: 5 minority - 5 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	403828	1927026	534310	63785
2	3059471	97305	687097	725589
3	10195857	710415	2637894	1518015
4	127672	2533793	2827849	857167
5	112762	63185	1120303	2675584
6	2932993	723929	210139	2058017
7	1059988	108558	18506301	201705
8	514392	3735454	78049	1776418
9	24126032	818070	1118767	2549440
10	2888400	16880369	5881041	3769088
11	621924	87911	948491	5269222
12	634840	129761	177112	18498652
13	353618	823259	65152	37859
14	3339180	1349301	70949	289101
15	17118459	2464494	1484376	910314
16	18320	2249822	3071761	7468432
17	1573993	667220	816967	17910000
18	287933	227645	8180151	2754463
19	3826778	18801364	121611	13461043

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	498774	46842	56353	6959994

Table F.4: 20 runs with 10% media nodes: 5 minority - 5 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	16455478	70671	338360	1255008
2	292232	659519	5830256	849397
3	101942	110673	12052095	66780
4	1886171	770582	616917	390765
5	74364	57293	435285	5248544
6	1502544	410935	19304044	447277
7	13222790	5697593	3802556	400879
8	1922919	4876084	1214674	4668763
9	210531	447956	75159	7722
10	1004678	27208592	202692	2533129
11	8387629	70619	151498	121717
12	4606615	28720500	6170257	3085886
13	1519490	11380368	902028	1651876
14	69151	223146	69754	5354150
15	555443	1484632	65305	7059126
16	73916	47709	23429393	115910
17	85120	192683	135729	2757302
18	46175	4214803	257442	7024323
19	1631823	800615	1739006	582793
20	814746	3336653	44192	454608

Table F.5: 20 runs with 10% media nodes: 5 minority - 5 majority, AND = 10, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	37820	5198054	77103	46512
2	83390	272179	244466	1108899
3	118194	3474988	892850	587457
4	1110070	111980	622053	1908926
5	591154	242803	198808	615157
6	612315	134394	24277594	2052229
7	841810	370856	682877	104994
8	82405	841437	364053	1457574
9	4143341	4278997	502960	28796422
10	3695884	4810658	141367	4086551
11	240485	15169728	673970	428490
12	268718	225718	996056	165682
13	166416	158979	20628	416977
14	449927	4888973	538519	302907
15	168077	2091568	279877	24971
16	148097	255090	355918	324370
17	464729	188866	56196	853260
18	9009096	2897656	30638165	38771713
19	2606928	618379	63229	208576
20	10285	24070	858073	279201

## Appendix G

### Tables for 30% Minority Media Nodes: 3 minority media - 7 majority media (20 runs)

Table G.1: 20 runs with 10% media nodes: 3 minority -  
7 majority, AND = 6, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	1167499	72617	28197	9930837
2	6290	3620908	449235	247500
3	1680425	24799412	691874	522374
4	2491919	236088	2505277	849913
5	7254242	1394291	95907	718962
6	70893	146410	346556	478929
7	40662	480419	594020	8234517
8	104136	355436	9541790	824903
9	315597	140374	3876470	1855820
10	40397	1018229	126097	1044443
11	4212282	53411474	1056995	2503289
12	191640	431289	280784	21043780
13	82689	3792500	47272267	524356
14	202710	3358543	265043	687348
15	66120	421588	2239562	22100
16	91713	97651	412022	137828

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	115289	333988	214775	141860
18	25379673	130286	2152953	1039689
19	8350699	187540	283534	12673033
20	4340846	12803564	9565586	292595

Table G.2: 20 runs with 10% media nodes: 3 minority - 7 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	521946	196555	718896	138238
2	1810281	315032	439646	315899
3	253393	1121543	212281	305993
4	1089305	485668	121421	141590
5	1038590	177937	390431	351005
6	406287	278200	150575	4233980
7	233268	201574	970908	172072
8	174687	1461904	2104677	269634
9	173685	548894	272306	150049
10	1039519	238624	130976	391792
11	3499577	1166685	101222	105578
12	382135	163792	4778797	139527
13	484511	128685	240125	2670571
14	8873462	1333875	560258	223363
15	435699	134573	106121	182191
16	1116235	877771	207505	737617
17	1993766	9946202	208014	1727942
18	851597	244917	470658	170723

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	5222661	13234843	1097766	125183
20	1333097	4220216	2186716	354503

Table G.3: 20 runs with 10% media nodes: 3 minority - 7 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	115968	168217	316905	746941
2	2088	1161815	136063	110145
3	1413	359829	644084	218450
4	392	124302	457368	1176364
5	578	1842578	1055752	764682
6	1971	257723	788148	168069
7	799	158519	381995	3349725
8	20704	118852	220398	147210
9	578	1194605	196674	109110
10	13561	734648	448546	214662
11	2705	153697	1203112	102234
12	257	1823017	697656	529744
13	635	340741	446918	285908
14	141903	7642712	178570	161425
15	302	181110	376117	178793
16	886	2718238	550363	4482595
17	1043	959343	231743	123394
18	1488	231901	274053	3321571
19	790	482826	907341	129597

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	36132	191715	5745219	11628399

Table G.4: 20 runs with 10% media nodes: 3 minority - 7 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	249	13787	4818	21872
2	2263	9631	183332	2155
3	241	2545	4910	40362
4	662	1564825	5650	13777
5	4645	8770	1571	3028
6	11756	26199	5824	377477
7	11801	3622	3420	40273
8	4005	1144	4836	234142
9	1618	1157	78943	7159
10	1541	1456993	8476	8290
11	462	1484	4142	8970
12	568	42010	26887	53596
13	373	7538	4372	574688
14	43139	829	7449	91254
15	19960	994	2902	29606
16	353	661	13495	94964
17	108077	2373	189246	399554
18	2284	7223	20696	54255
19	199	2490	18089	16863
20	350	98572	53228	24760

Table G.5: 20 runs with 10% media nodes: 3 minority -  
7 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	97957	10578	96214	2818
2	603	8567	134005	6289
3	6739	84459	25490	9539
4	1394	1069907	31764	16704
5	385	2186	3295	8981
6	6609	1216	158798	1928
7	127111	66653	1507	13295
8	769	778	11356	162350
9	3206	1303	851	3336
10	6657	1807	17937	9128
11	2323	7726	489	20410
12	825	13203	14021	20131
13	55572	1890	2751	14643
14	581	292896	2186	30683
15	1939	1048441	4145	13665
16	60517	139963	987	13204
17	1781	2736	33361	9111
18	300	1725	16056	6816
19	191	2609	1595	199873
20	1565	762331	5406	11611

## Appendix H

### Tables for 10% Minority Media Nodes: 1 minority media - 9 majority media (20 runs)

Table H.1: 20 runs with 10% media nodes: 1 minority - 9 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	932	2505	22824	7052
2	340	4280	5153	4498
3	1985	4430	930	191963
4	1021	501	43013	6232
5	1218	730	2080	7824
6	535	4518	2611	3453
7	21442	608	23503	8800
8	1155	17872	8076	40930
9	1564	58859	11906	8006
10	1860	56033	2953	49962
11	4095	1753	6435	7798
12	1012	5131	40710	11787
13	482	4144	1193	3609
14	672	38245	40086	11772
15	442	16960	35155	22856
16	11037	1224	3277	5745

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	612	11956	29161	2757
18	262	3025	3901	3833
19	347	3161	6336	3392
20	510	15426	727555	6230

Table H.2: 20 runs with 10% media nodes: 1 minority - 9 majority, AND = 7, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	466	871	54642	7543
2	1758	1277	6490	1574
3	343	1566	34793	98582
4	4435	70127	53905	106512
5	2230	6680	300455	23463
6	271	1701	9743	44159
7	414	526	761	20646
8	13202	808	36833	4105
9	2251	1603	14051	4222
10	166	1195	9766	3089
11	571	995	1592	5159
12	12523	535	1665	7405
13	1421	1379	2016	39351
14	477	3833	3821	6839
15	2499	7119	4659	1826
16	535	4023	859	2052
17	968	1456	36983	48120
18	1720	288	1334	2370

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
19	1119	7785	1044	3573
20	9437	3550	976	32235

Table H.3: 20 runs with 10% media nodes: 1 minority - 9 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	79774	1308	4886	2244
2	3236	526	4848	3026
3	1053	2428	3690	25125
4	249	6533	5094	30444
5	2412	22522	2262	13640
6	1052	2106	3417	12026
7	2603	817	2878	11305
8	6313	10428	1077	19063
9	905	1264	1938	5985
10	785	617	1613	2113
11	1654	458	10714	10406
12	277	1952	7854	18641
13	616	426	6328	4780
14	342	811	37151	8905
15	383	1439	1973	23899
16	677	2008	2908	31265
17	1127	13070	1971	17932
18	364	1513	5258	4156
19	1970	1554	1011	7707

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
20	413	532270	1504	10209

Table H.4: 20 runs with 10% media nodes: 1 minority - 9 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	236	887	11711	14324
2	336	91212	1314	12301
3	849	2311	1629	3677
4	761	2985	81117	4060
5	607	782	2672	2795
6	367	1501	2444	4144
7	890	4139	2154	1316
8	530	1059	3353	8360
9	704	1284	2580	3142
10	497	7055	1790	2647
11	1622	1130	13684	13361
12	357	12159	12154	895
13	723	780	1177	3495
14	515	1236	29839	1979
15	845	1648	5086	25629
16	3689	2842	1322	1411
17	634	2496	1536	4067
18	7461	724	1380	11654
19	674	644	1571	39993
20	476	1373	1199	3457

Table H.5: 20 runs with 10% media nodes: 1 minority -  
9 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	903	756	1872	4217
2	210	666	4892	2819
3	1382	1023	5030	14379
4	482	1518	2931	1119
5	8717	706	22937	2560
6	1784	1148	4361	6658
7	662	448	1889	43308
8	689	1030	876	3254
9	1791	417	7175	1514
10	1142	1265	1890	5167
11	929	9772	70916	3252
12	610	882	1108	1791
13	679	462	2349	15570
14	2230	2334	3055	3553
15	469	1449	5896	1825
16	2584	573	9170	3845
17	354	957	33734	7192
18	689	898	3191	2512
19	539	294	1369	3223
20	427	2286	2819	12643

# Appendix I

## Tables for 100% Minority Media Nodes:

### 10 minority media - 0 majority media

### (100 runs)

Table I.1: 100 runs with 10% media nodes: 10 minority - 0 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	39940	8071	6406	83683
2	33749	25351	15607	5572
3	18808	8413	32367	9251
4	32288	29642	10939	41722
5	22310	4416	8860	7298
6	13780	45019	11400	3271
7	23949	13318	324643	8590
8	67732	23300	245983	7134
9	17176	16896	23424	19913
10	10405	14952	46130	12164
11	45408	28102	4553	21398
12	53632	32320	21655	13873
13	20648	6038	16852	93660
14	59572	9695	6865	117543
15	10698	17993	29015	18218
16	53799	30037	18419	51748

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	19979	20632	8170	9759
18	38754	488268	10373	6359
19	52825	4502	20738	22486
20	17165	18073	8765	27842
21	20188	5911	17260	2760
22	13477	21696	61779	40881
23	11057	14996	75472	8963
24	13013	68187	51884	24963
25	36202	7404	47016	59692
26	8706	187604	17039	79625
27	24616	24294	18793	23269
28	30217	11501	77362	6859
29	61482	10124	40464	15377
30	13073	19290	12393	21814
31	15734	82587	6085	14587
32	23746	18363	7896	14675
33	7979	12921	247323	21035
34	5745	7239	12183	22801
35	34691	8796	16330	29704
36	5585	48764	13663	8662
37	64526	25974	39243	11815
38	31599	43819	8590	30422
39	96772	18602	22780	6222
40	50701	58373	6521	8534
41	14504	48895	20144	30494
42	48145	31629	15139	8475
43	13686	11457	5811	10164
44	6794	15587	57294	8189
45	16005	10807	8308	7247

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	49136	15541	10883	8839
47	17490	12591	12360	55147
48	137549	13046	25544	22096
49	21834	16739	14183	2799
50	20756	14108	14042	12795
51	32305	15102	18098	10089
52	30781	13675	20747	14619
53	262423	18511	12385	19262
54	25239	13214	19092	6105
55	82053	22102	23015	13434
56	46071	19463	37635	22265
57	15367	13789	25059	32394
58	44085	14716	5103	3771
59	34868	9408	10777	4409
60	26934	75662	11291	5151
61	15128	6852	11271	21353
62	48229	17804	27739	12219
63	28181	5200	79561	24601
64	12317	25154	7080	9349
65	10465	15378	10433	18966
66	10530	15976	20833	20481
67	45059	54861	28838	25355
68	12647	20978	10261	41676
69	24962	84729	12545	16509
70	85803	18200	17985	16094
71	15997	68031	7701	9388
72	12369	15524	19772	27334
73	41252	29025	61096	11459
74	21333	64050	3597	6989

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	4719	14312	16177	12286
76	17639	9840	9573	179397
77	42900	18763	13224	20678
78	33599	10868	9825	12679
79	22303	19172	22074	14407
80	13369	10589	4672	5481
81	63877	87069	39871	24847
82	12748	13025	48816	188144
83	28844	156152	262345	5717
84	16318	29242	42327	13198
85	12585	149222	13235	11020
86	18188	9495	52735	9006
87	18785	40247	14977	14967
88	49060	19445	16370	8096
89	246583	15218	14988	14480
90	15380	24844	69254	35446
91	22048	14325	21903	10150
92	41928	23027	11160	8686
93	37077	28430	32818	11376
94	27024	36451	12912	49251
95	15210	14443	13265	9462
96	19926	14732	11215	21624
97	39787	9093	14901	10197
98	53181	29497	21243	8990
99	31448	25144	17240	14865
100	32513	23432	40913	19811

Table I.2: 100 runs with 10% media nodes: 10 minority :  
0 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	12781	16978	32481	20095
2	57775	38059	43961	16645
3	4670	15503	6497	14524
4	28686	11202	13133	19056
5	9361	6405	17407	12733
6	5610	18561	7585	6167
7	17032	20416	3326	7825
8	16313	9908	13562	8056
9	10365	8322	9965	5212
10	8800	43704	18911	49606
11	8338	7820	10058	16879
12	22667	6459	29809	40388
13	19530	19184	6443	12825
14	6890	13785	18084	19318
15	15988	15496	7590	12983
16	9245	23107	7843	4883
17	17022	10061	5925	3430
18	42925	9136	3592	3859
19	17291	18846	6412	16634
20	32042	18251	15421	17659
21	5558	12110	13942	6591
22	9989	115723	10365	6346
23	13754	33196	18772	10712
24	15922	20134	32509	29344
25	9632	26682	50382	7093

*Appendix I. Tables for 100% Minority Media Nodes: 10 minority media - 0 majority media (100 runs)* 180

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	79993	6392	6810	4256
27	27349	9905	12443	10252
28	49892	13446	24944	28242
29	30623	13320	15594	6758
30	43257	37460	17542	17545
31	22524	16138	19857	3669
32	13219	17470	57962	6604
33	10355	5734	16010	17288
34	28578	8651	11390	20656
35	16454	12311	6947	13884
36	25322	51213	5099	30143
37	14915	19766	49357	13708
38	10138	24954	6572	19997
39	10589	16886	13121	4716
40	22392	4375	3657	18111
41	15405	14364	33719	5060
42	33230	64906	12740	8724
43	7872	27077	51197	3708
44	7461	14941	6825	9525
45	6801	12853	16984	8093
46	49318	16106	6718	7082
47	11819	6389	6008	3725
48	6895	20401	15797	10627
49	9968	15575	8918	13680
50	35880	55922	24229	3998
51	46507	11565	8319	24194
52	46086	32125	36744	2942
53	14977	10768	8062	12376
54	15853	97893	39354	4898

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	37312	8537	27448	11564
56	6470	23099	3897	11067
57	8192	11969	21078	2485
58	22378	101510	6095	19748
59	19180	22229	16199	9988
60	11883	76689	16144	21601
61	219851	6083	9261	9139
62	12106	7206	79242	14189
63	16750	11552	10912	4522
64	10914	14623	10161	13836
65	23470	7598	7471	2583
66	23807	38492	5611	4117
67	15119	16246	7946	10294
68	51424	33322	35516	6259
69	18263	19118	14907	5510
70	57971	11051	8707	11534
71	30663	14537	7167	3790
72	9176	14117	60087	19389
73	11100	76302	32479	10282
74	51060	22872	32565	9571
75	6347	13582	14604	6175
76	10289	29018	9122	8680
77	17989	17717	59833	12447
78	9287	13059	47671	6516
79	15783	53257	6769	6540
80	7488	6022	9658	30419
81	12287	22762	15402	3894
82	11094	9540	35872	17337
83	21216	13257	9249	3112

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	37117	20185	21582	45992
85	18996	20709	7609	5977
86	8706	7085	20043	25819
87	6005	13287	4798	9955
88	36389	15596	3367	11917
89	13795	74330	14756	10997
90	17385	13115	18736	17679
91	25010	10891	10043	19908
92	7001	30259	4917	57837
93	16545	59194	6594	24575
94	9813	5670	25939	4780
95	20625	5492	72537	7781
96	68424	11697	59955	5846
97	9189	25214	9085	32954
98	37008	5911	2744	8644
99	10800	50584	12465	11604
100	6414	21443	3685	21372

Table I.3: 100 runs with 10% media nodes: 10 minority : 0 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	12126	9340	39671	2651
2	21496	6649	25306	4485
3	29026	7251	7007	9393
4	11952	6086	10645	2915
5	30204	15152	8828	14739

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	8092	10914	4819	24627
7	21898	9395	16586	9951
8	6693	11446	8393	4251
9	13085	4885	3573	5297
10	5283	7968	30273	4972
11	10488	11293	9128	11604
12	35563	33067	16317	2971
13	8921	7359	12473	22908
14	46984	10508	15283	6171
15	9443	17811	5151	7718
16	10033	23646	3830	11024
17	15828	10506	6992	13794
18	27886	16078	7578	2635
19	11119	10194	10345	5008
20	5801	22528	12420	7396
21	20659	3270	10308	12011
22	6123	20717	10597	5502
23	11092	24734	5147	9683
24	23121	3914	76439	9684
25	23358	12671	17127	4980
26	7117	5168	13768	11886
27	9653	9159	8326	3635
28	8359	47286	64889	10398
29	16570	12814	9073	5671
30	14072	10684	3254	3178
31	12719	20212	14734	6670
32	14761	15766	6249	8157
33	11776	9286	7644	23696
34	92453	5947	6578	25388

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	14460	10567	4804	5754
36	6797	8604	7216	10042
37	6427	13929	8479	10752
38	6438	50398	16495	4107
39	10709	19069	5223	18487
40	8359	7295	12740	10119
41	9754	15171	4430	12677
42	18557	8655	9608	14780
43	20714	14842	7720	9181
44	9578	23567	9611	5722
45	13847	16988	4803	2858
46	13673	13140	6719	7376
47	6391	8807	5054	6444
48	8402	23175	35962	6752
49	8515	4924	10533	18267
50	24224	17282	9430	29521
51	6896	10725	19157	2221
52	71887	7397	6106	6291
53	13492	38354	9249	5599
54	10355	14044	8750	6123
55	18052	8050	11977	6203
56	6835	15353	10027	3761
57	13274	13248	22814	19361
58	34010	21605	8278	6098
59	7765	21073	1682	11805
60	27205	8030	4116	29479
61	12888	16081	16118	8917
62	20099	48507	6454	12473
63	6980	6002	4553	2964

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	10522	6226	15990	29056
65	20586	7691	24741	11968
66	50429	5055	3994	10358
67	21738	23822	5190	11618
68	12797	22438	7497	5378
69	6915	6105	12847	20918
70	20786	9834	39183	95224
71	12213	8176	4838	2477
72	6056	13264	14087	38960
73	8444	15357	7272	9027
74	10860	6275	11359	2037
75	41005	5446	2443	14681
76	64743	19556	6463	3845
77	4841	10886	7482	1905
78	13777	19343	9435	6529
79	31943	8653	4645	11618
80	45694	7191	7418	9040
81	10302	6375	1818	4861
82	10380	4282	7597	9222
83	15142	9746	50802	33372
84	25433	11158	11978	194650
85	8072	19859	8771	5293
86	19254	7703	7997	9436
87	6238	12763	6923	4665
88	14202	7348	12177	15018
89	4752	20842	24079	10249
90	41944	8466	12735	8717
91	12847	7094	6703	9737
92	10723	44568	5023	11338

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	17590	12710	7486	9262
94	8543	22289	4932	21701
95	22275	6506	7871	8663
96	18683	9267	4272	5276
97	18726	11809	9177	16220
98	31921	13179	8496	5804
99	18663	20568	22585	26101
100	11507	11219	10990	43918

Table I.4: 100 runs with 10% media nodes: 10 minority : 0 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	3415	6006	5231	4329
2	11006	4051	4474	10950
3	13989	64862	22088	5895
4	8852	9693	4726	3963
5	12533	9314	5823	8708
6	10634	21622	3242	6527
7	12528	22846	3753	3510
8	26892	43709	3719	4015
9	6210	8151	8822	7916
10	12861	9104	11227	6546
11	11318	5740	19531	7427
12	34367	9666	10473	13633
13	12724	7634	9605	7159
14	5880	13266	2444	7707

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	7878	9406	4625	12785
16	58014	35569	4568	3385
17	9464	4484	10560	10563
18	18963	10306	4766	19292
19	14700	9247	7488	2687
20	29962	6210	4526	6337
21	8587	5312	2285	5149
22	18367	8246	8538	5928
23	8598	6461	11301	16521
24	23363	10484	6128	27876
25	21548	15358	4030	2623
26	20753	13669	3020	5240
27	6062	18259	5412	7126
28	10806	4862	6277	2643
29	9338	20803	4544	3382
30	39571	7054	18323	6053
31	6857	9424	6993	10259
32	20750	17296	40892	10547
33	24348	3026	10947	2712
34	13265	8309	11377	2760
35	10689	4539	11034	4420
36	6910	5274	14193	29178
37	8816	9811	12150	16317
38	8080	51626	6541	11996
39	16584	19105	13443	4966
40	11197	8478	7197	1620
41	14472	4520	7257	9333
42	9261	30047	7763	3326
43	17849	2677	8401	10977

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	14502	12657	10190	9553
45	8207	7077	28711	15754
46	5497	4621	12706	9279
47	21550	8482	4506	20088
48	12911	25827	15999	5608
49	19759	4837	8060	5779
50	48510	5186	7076	6086
51	40741	5416	37460	14379
52	12172	6281	6269	16948
53	6072	8365	19380	11376
54	48336	30114	5524	3063
55	12638	4072	4964	8248
56	9897	10123	14548	15439
57	6876	8279	5840	14823
58	29994	5851	1967	5740
59	3801	5858	16496	2999
60	32453	9245	5320	1739
61	8498	8844	5213	7370
62	7617	7939	5579	5645
63	11647	13815	7190	3872
64	3410	24175	13196	9901
65	9769	13345	2914	15266
66	13457	23136	9907	25337
67	8271	37310	14463	17304
68	15797	4798	34566	21970
69	5152	5519	3501	2273
70	22365	8411	2694	21352
71	17866	8182	6488	3771
72	10337	5416	5240	5133

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	7357	11929	3506	2798
74	13550	5021	5174	9711
75	4111	2728	27902	3005
76	25188	4986	3431	9482
77	35520	20528	5294	10128
78	13549	9537	23338	7031
79	23298	31268	7328	8000
80	6590	7278	8466	61528
81	6263	5661	10688	20918
82	6179	6027	10519	8490
83	11724	17702	5460	5344
84	17086	6808	6464	6400
85	11196	10152	4429	9516
86	12083	18242	8393	11305
87	18025	12736	17482	7127
88	9198	6222	11808	8168
89	13767	4546	13959	10383
90	10518	26156	7934	3342
91	7410	19393	5759	18466
92	6670	14346	19723	4996
93	6655	12381	3496	8819
94	9013	14226	10612	13831
95	10183	8588	15732	4090
96	8665	6618	3453	1732
97	13654	7497	11306	11446
98	32643	8503	7831	6141
99	10515	6963	7366	9605
100	20371	4029	3864	2109

Table I.5: 100 runs with 10% media nodes: 10 minority :  
0 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	10026	15189	8234	17434
2	11741	14980	8736	3591
3	8481	12332	2676	13264
4	3853	11857	23446	2995
5	11718	3798	4084	4213
6	3966	9120	3515	14111
7	4983	19806	4294	22397
8	10920	15034	15459	4940
9	22086	5485	4266	4836
10	8860	14567	3269	13574
11	4472	5442	10081	6009
12	5260	28407	3621	7377
13	16042	12654	9510	5354
14	20597	6242	18165	4270
15	16525	11085	7288	29128
16	5698	8952	4110	2756
17	47887	56228	11666	34092
18	20866	3061	19879	18986
19	20132	9592	5964	2297
20	9563	10952	7163	2547
21	8704	13907	12596	7271
22	47607	8870	14774	21382
23	19202	6072	3160	5589
24	9479	12864	28419	4486
25	17319	7625	7809	3811

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	16384	2907	5360	5379
27	9604	24940	17584	6597
28	12921	9568	6372	4078
29	11954	4283	5938	4384
30	7744	10720	3823	6570
31	13727	7426	8500	3667
32	7880	7,335	6962	3523
33	8811	6715	19528	2936
34	20195	10908	48071	4344
35	7867	8889	11859	2048
36	11842	18388	3111	7387
37	7288	10929	4917	9582
38	4567	22427	6781	2433
39	14174	10036	14346	4296
40	4551	22639	4681	8204
41	13459	16371	5627	14423
42	7305	4197	4896	7620
43	5917	7555	6475	28394
44	8384	9881	5016	8643
45	8400	9283	3884	3771
46	22628	4196	9355	3554
47	8429	11930	4347	4107
48	8541	5073	9191	3941
49	48516	8067	4161	2948
50	41630	6707	8765	19619
51	5911	29356	4272	5255
52	12128	25394	6956	11244
53	27070	9014	24430	6354
54	13389	6582	7804	2832

*Appendix I. Tables for 100% Minority Media Nodes: 10 minority media - 0 majority media (100 runs)* 192

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	9621	3755	24357	6413
56	24636	5540	8030	2017
57	17554	13774	6609	2617
58	20472	12354	12229	4751
59	6548	15287	3634	3853
60	6612	6709	21493	17603
61	13494	5542	5815	4230
62	9500	8701	5263	2778
63	15928	9312	4374	11393
64	11435	3778	8100	2141
65	5912	18775	6858	7311
66	12928	5562	5948	2172
67	7656	11347	13951	7447
68	6803	7534	7306	2674
69	5619	11610	3946	2709
70	3564	43855	3073	8472
71	7213	10693	6856	8826
72	5319	44577	17207	1483
73	8393	11792	8884	6150
74	11562	8937	4991	4336
75	17038	22006	8990	2054
76	14267	17009	10032	15763
77	6091	18597	5098	4954
78	19376	19499	5958	14342
79	9587	16053	4454	3424
80	6619	16938	5508	7243
81	10994	13958	12872	4054
82	22982	19119	14359	5013
83	9733	10085	10968	3332

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	16247	8518	4799	3934
85	7987	2946	4266	6974
86	9467	6573	6985	3011
87	15488	12723	3808	4622
88	13323	6006	5068	3812
89	8678	8855	7637	2601
90	11584	12641	18656	4282
91	14384	5587	8502	8884
92	8071	5259	25194	8358
93	6411	5296	9043	5138
94	10305	41087	2909	6637
95	21154	13229	5979	3025
96	11280	43807	4585	7429
97	32212	16969	7428	11305
98	5837	6578	7003	9004
99	9493	6674	5925	24259
100	7805	7658	7329	5806

## Appendix J

### Tables for 90% Minority Media Nodes: 9 minority media - 1 majority media (100 runs)

Table J.1: 100 runs with 10% media nodes: 9 minority - 1 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	46038	44324	56560	20866
2	11149	69231	95260	9806
3	58429	7893	18806	7297
4	58429	45490	16060	137003
5	74738	42868	6225	44644
6	34261	11705	6518	68506
7	17414	18247	60401	8116
8	39085	36734	67519	21877
9	4788	387685	38155	65791
10	67195	42644	54333	7882
11	21735	34967	9594	17034
12	18608	25706	62968	10492
13	105546	137129	5412	25087
14	42318	14762	33435	66089
15	42812	64423	14612	34782
16	12952	8777	18740	56665

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)*195

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	120626	37813	15593	76640
18	46512	27316	13600	154433
19	34298	51722	181154	23391
20	19785	76439	29275	29352
21	55453	111416	21245	23186
22	10792	24480	39583	116300
23	58833	76125	16491	216334
24	57491	16912	42050	18244
25	16257	266382	15347	32860
26	25566	210108	19624	18222
27	6994	193601	24915	10962
28	16948	37841	40665	12064
29	44312	25900	9893	21309
30	18658	78368	71243	31551
31	339693	66431	25196	12239
32	41980	132978	7909	20670
33	40349	20776	14559	25586
34	22641	13523	147567	129890
35	1064430	14468	65914	6092
36	52411	22661	186758	12945
37	140060	9865	18150	27147
38	17134	30600	97549	18811
39	35268	80610	46882	20144
40	12635	57630	55972	7144
41	586049	36558	27160	20078
42	11181	31312	102507	95049
43	36145	5469	20581	66398
44	15262	21972	23192	20882
45	30389	16779	20966	23074

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)*196

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	16002	120543	21690	39613
47	25139	40644	9416	18631
48	12148	47406	229321	14155
49	8500	89623	34675	20652
50	30049	172724	26936	5247
51	79581	70101	16300	10248
52	9388	30226	55853	8783
53	78262	20223	9988	131398
54	46711	12319	20862	17192
55	71110	30137	17742	38392
56	97157	9097	84944	7989
57	252289	151130	21135	513254
58	29691	34111	18398	9364
59	355233	34359	51252	43737
60	42018	28308	15771	20263
61	42961	57505	19225	39986
62	25196	16800	40488	7612
63	14974	13018	29482	34201
64	26464	84010	17947	9991
65	108320	158540	24065	23771
66	21882	17645	331275	42714
67	30111	30299	15256	69171
68	36606	96061	29905	16422
69	19548	61178	19683	37231
70	59816	16141	16237	12797
71	54275	9058	28804	10774
72	9310	24299	107418	10427
73	124303	41177	64505	18924
74	69523	39234	48980	11654

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)*197

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	38159	188201	29262	15840
76	12082	15047	16938	4511
77	129157	37316	13495	8426
78	22116	27108	46121	24275
79	18379	54827	54174	23368
80	219942	298844	158676	418320
81	44250	27903	13081	17112
82	24612	48956	11555	8414
83	32645	6352	131215	11743
84	155044	17556	4379	10523
85	32382	48833	13624	19146
86	213536	198415	10368	19262
87	12047	10225	16762	36289
88	102691	21202	28813	46209
89	20047	14175	98810	50284
90	152819	24550	15197	7847
91	13727	68501	23875	15285
92	245838	61009	126265	89947
93	22777	9050	53668	72830
94	22630	19058	22464	58929
95	75329	15832	11959	25545
96	47056	27450	33629	13384
97	29531	12983	22297	6934
98	37428	188639	61461	49087
99	10850	9429	11015	17269
100	44122	430095	15797	17562

Table J.2: 100 runs with 10% media nodes: 9 minority -  
1 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	16956	12006	55645	18532
2	21617	4464	13029	17707
3	16278	47181	56762	12671
4	25687	14555	80943	14533
5	146422	15718	33365	18890
6	25055	23202	53355	117999
7	18050	26233	43657	22878
8	15189	15389	21175	20714
9	226683	11933	32507	3402
10	61686	29239	29224	58612
11	26868	28758	13437	6230
12	131134	48124	13624	56101
13	14290	61937	10928	14845
14	6520	63144	21891	23864
15	59319	47096	17426	5097
16	11483	31714	8451	9039
17	36970	47732	11062	21311
18	5965	75062	2453	9934
19	14917	36557	15342	70948
20	18000	8251	55569	14433
21	9586	11260	26823	11353
22	29469	27361	20651	4546
23	10572	16917	18389	10366
24	112168	11762	82395	46975
25	24469	32865	32765	6796

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)*199

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	37955	32270	25521	11133
27	18951	19810	9055	20494
28	15532	14898	20808	22922
29	67164	23719	12220	18543
30	15532	9788	19108	66146
31	16776	18038	173616	20900
32	157574	48398	39718	38216
33	13821	29247	129678	12020
34	11499	18760	13060	185889
35	26383	83334	27454	43066
36	18686	55414	12359	26580
37	7406	16868	122091	6415
38	110593	73049	25471	11399
39	27259	27682	11992	3963
40	284193	24328	38583	37749
41	24060	4133	20843	16844
42	7100	13734	13686	4337
43	283343	18008	14281	184313
44	66126	90210	265204	10553
45	19373	12732	21704	80035
46	25523	38830	63570	3800
47	17161	42567	30374	2619
48	30374	19782	17647	16586
49	428488	15845	7216	63348
50	26590	143351	12834	8045
51	29291	20291	20869	18590
52	30292	24394	8697	6749
53	14101	31912	3185	5725
54	35274	130674	15122	17686

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)200*

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	36504	19463	10856	47069
56	54734	46674	7504	20082
57	6661	82952	38465	61156
58	29765	15262	25408	15092
59	41567	15121	28504	85135
60	17403	14567	13674	59924
61	11547	16154	20691	4981
62	30614	32516	29114	3280
63	116841	31802	20809	69304
64	40315	7793	15601	16394
65	39510	26677	16088	72539
66	14112	11215	21804	20149
67	12176	27430	17445	12782
68	17101	330477	22111	31993
69	22526	86510	7898	92143
70	25328	13799	40803	8003
71	24806	127515	5207	9106
72	182525	15825	7515	8384
73	52629	105532	41670	8552
74	28570	37246	17217	6039
75	20792	176242	18663	15129
76	59854	8191	31253	2598
77	31666	31308	2942	5054
78	10466	29488	13603	9237
79	18588	118536	3708	15664
80	11926	11311	104384	2875
81	24724	77932	8099	32341
82	209859	59166	12144	19340
83	66833	14372	60219	28341

*Appendix J. Tables for 90% Minority Media Nodes: 9 minority media - 1 majority media (100 runs)* 201

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	19767	276778	13377	8559
85	10825	11013	9867	16379
86	14645	22703	4696	5648
87	24697	14965	27186	10579
88	24902	55164	9071	12229
89	93108	13172	5844	2567
90	20542	15608	16192	37008
91	114775	33109	53774	13634
92	8643	35506	22750	14337
93	13970	13110	3962	57936
94	21858	24046	16075	16635
95	10436	40406	53228	21444
96	20934	36972	47329	14099
97	34107	12324	42513	11269
98	73202	16007	22026	16224
99	30797	35490	16951	10409
100	10990	16956	36000	10591

Table J.3: 100 runs with 10% media nodes: 9 minority - 1 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	10319	83027	204158	6286
2	15036	21176	9889	6757
3	13782	195729	7838	20905
4	41300	31375	17225	55289
5	15211	32077	11565	23798

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)202*

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	19426	51982	29291	3887
7	13080	137430	23355	14646
8	25310	125788	26347	27405
9	28568	9761	5120	16208
10	23107	10417	8230	13181
11	12016	10533	7142	3372
12	10651	18044	7978	13460
13	28732	30764	92328	7462
14	19703	27101	40117	5118
15	24492	59131	16445	10457
16	42932	16888	28038	5474
17	26605	37042	22095	194266
18	75357	23770	16421	10517
19	9663	20485	55267	35272
20	45754	17643	18588	39791
21	21418	8923	13967	13633
22	16162	15180	15589	19446
23	340550	32777	122922	4066
24	9195	12311	27813	7650
25	16082	57352	5879	6280
26	31226	5353	57418	18105
27	39767	13477	29258	23913
28	32993	8144	10638	5745
29	17301	12850	18563	3467
30	33933	22384	30135	89473
31	33086	65377	193987	19317
32	21862	8113	15106	31506
33	50496	10383	35292	5395
34	22434	18517	15264	120787

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)*203

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	17659	10392	16218	16222
36	18646	36226	26036	15443
37	14322	2340926	35345	24932
38	18002	6523	28869	27080
39	10161	7573	35971	10024
40	7029	14893	9848	21135
41	12063	67320	8072	5172
42	24123	12526	20819	3570
43	22332	23639	607676	296257
44	15391	26005	10509	72382
45	130242	12923	7034	7626
46	19550	80241	13067	6949
47	38594	31954	30442	5992
48	26752	24884	52878	10772
49	7353	25060	26756	13246
50	13643	13362	23270	7024
51	11280	14731	11149	36306
52	37076	495789	11735	8011
53	28570	10993	17723	6217
54	172168	41455	27061	11868
55	19149	35693	30516	61642
56	9791	20536	8335	12351
57	24578	29697	5641	18617
58	31591	26813	25460	5690
59	76227	7744	27270	17611
60	44932	22100	9847	19122
61	32527	36970	5447	29825
62	840878	17424	39624	14531
63	22129	14646	26194	4648

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)*204

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	24239	19508	14674	4861
65	14164	9035	53068	18740
66	18309	17372	8841	26371
67	12176	15686	51339	10413
68	25082	12763	16877	29552
69	15008	23643	6283	27069
70	21215	20236	10057	109751
71	33821	34874	39264	8685
72	7756	31129	24108	11885
73	13210	5365	17769	32733
74	118420	30119	6880	6263
75	33080	6520	35614	18784
76	7394	16283	15680	5830
77	9952	12512	16406	21186
78	92351	20667	33695	9707
79	8514	18944	61877	12654
80	17912	5374	17221	7388
81	16530	42139	72146	42596
82	71545	14132	33921	7715
83	13814	6549	30272	40736
84	21164	5118	33976	22982
85	64504	11366	20661	20104
86	35645	1179396	39448	12459
87	9802	12717	27180	15439
88	18732	12315	16542	41315
89	14568	33787	36836	7215
90	10273	100909	20048	69624
91	12748	23587	4915	7215
92	10158	19975	18698	35169

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	154556	25881	7102	70374
94	21138	7929	276902	22683
95	4526	5835	18221	8928
96	13183	9253	2948	20350
97	4000	9979	3877	5147
98	14254	17175	11037	14314
99	5765	29461	11842	5793
100	13122	20359	18126	29356

Table J.4: 100 runs with 10% media nodes: 9 minority - 1 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	36990	13626	19205	5201
2	29343	19746	12310	141204
3	16288	15313	6802	5869
4	16798	16095	9908	4759
5	8106	13719	18111	14499
6	36778	8501	14329	4813
7	25994	42394	21182	3054
8	15372	7143	5945	14913
9	6229	10707	13320	34554
10	8763	4673	16831	6582
11	17996	8226	28985	22443
12	8245	56830	28382	10880
13	27763	17068	10412	12674
14	12279	14689	17820	14235

*Appendix J. Tables for 90% Minority Media Nodes: 9 minority media - 1 majority media (100 runs)* 206

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	58810	5534	18443	20134
16	6518	10106	18365	7830
17	13900	38948	25698	7768
18	10659	44171	38315	3911
19	30656	7757	16307	17742
20	16613	14720	7396	10153
21	71670	6521	23231	16257
22	20475	61947	35284	8645
23	17640	36249	16727	2251
24	53318	15317	14623	19275
25	28300	11257	13992	24507
26	54342	10612	9470	44033
27	19275	12475	5646	4728
28	6539	15295	16053	14410
29	30002	12063	9323	3871
30	45145	16664	7327	6666
31	19583	9355	11835	21712
32	20889	8885	13608	3730
33	28493	23042	5954	43935
34	8826	8037	11234	27585
35	24754	16082	9305	94588
36	9446	14330	5409	44935
37	12062	17616	6296	26038
38	13790	18803	161867	7945
39	42130	23329	11352	21098
40	23312	30849	30592	16267
41	7926	15188	9290	27294
42	15416	22101	7510	6263
43	12309	15309	10336	19454

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)* 207

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	8675	11736	38547	27220
45	26752	17860	27738	23146
46	11932	93801	131416	3870
47	14453	17905	24877	9173
48	10305	6435	10434	9960
49	35228	27156	15320	4386
50	24384	26467	16178	3104
51	28730	4410	2524	6577
52	8775	8414	25579	12367
53	10260	10161	43406	90530
54	21937	36240	18593	21785
55	15377	10776	17037	6485
56	9454	11744	10090	67916
57	10460	9909	10744	15200
58	12884	18269	18944	28860
59	10659	13468	10643	9953
60	11966	9434	5218	2646
61	17517	13115	118259	1838
62	13357	23128	18700	326694
63	14076	12650	13070	59290
64	20682	22998	47992	7944
65	27136	12866	10436	2223
66	9507	6636	4253	8657
67	184553	13891	6376	8989
68	44424	26102	23264	5514
69	6598	13349	4488	14845
70	12278	3202	14629	5806
71	23491	15633	10630	5099
72	10075	25680	5847	5143

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)208*

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	10133	10007	20064	10991
74	22268	22275	9660	37151
75	7661	22795	10142	11910
76	9340	7776	7259	16178
77	13719	16461	8333	5945
78	14232	21674	10221	35606
79	14973	5046	6627	3801
80	18772	8307	80835	11985
81	15675	18202	9916	10681
82	18677	8667	13171	4228
83	16718	16660	6862	7497
84	12589	29898	15860	7276
85	7462	8635	30733	3223
86	10223	507996	22988	13597
87	19757	36564	14161	13616
88	32761	33025	42004	7581
89	12433	14394	36541	8870
90	9790	40908	10307	28706
91	11933	6362	33014	8698
92	12919	6821	4867	5792
93	7524	35395	9093	8907
94	19270	52493	96853	18600
95	22424	5406	4401	16534
96	15483	10308	16077	7011
97	9811	5256	59508	12115
98	35243	13567	32657	7242
99	12191	13716	4591	5196
100	12291	13389	35649	4963

Table J.5: 100 runs with 10% media nodes: 9 minority -  
1 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	13112	6506	8055	7028
2	6037	21489	29979	20589
3	38627	35360	7132	6415
4	9270	6923	5280	12183
5	15583	9807	5299	7677
6	11673	44886	5773	4401
7	8415	8830	14138	8759
8	13944	18820	9813	3800
9	24467	14890	3815	7662
10	40412	4467	21318	112333
11	27253	7447	9689	7331
12	8143	19975	5370	8944
13	14482	10571	80302	3458
14	12604	11923	9834	8223
15	9687	15911	12158	5060
16	8226	7964	8841	2477
17	27527	11636	13170	31621
18	7750	11312	13694	12527
19	5721	11080	55224	5907
20	25752	14284	4491	3460
21	19929	24876	29803	6170
22	16783	19186	6434	29308
23	34309	96653	7093	5629
24	11737	7157	38052	21658
25	55229	5464	12875	12590

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)* 210

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	27543	29122	5309	8266
27	25661	25050	24394	2444
28	13054	6132	67333	2511
29	7862	7883	14545	6550
30	5878	8285	81076	15611
31	6582	15198	3789	7222
32	22070	18597	27818	7167
33	15046	12813	10138	4278
34	32581	44099	8040	110576
35	24080	10869	5917	14447
36	14476	5104	25488	3303
37	32452	32210	13416	44333
38	10457	6272	5919	3252
39	13695	22393	41925	33903
40	35358	5612	5011	5538
41	8738	9779	17621	5949
42	6228	33266	18754	6806
43	9931	10101	15250	20520
44	9710	16173	22934	8900
45	34123	16033	12923	5748
46	37809	15355	14479	6987
47	30901	17371	10147	7553
48	10686	14921	8447	10924
49	16443	7729	21274	11639
50	19359	4531	14886	4414
51	18474	19888	19323	2814
52	15325	5419	4492	8591
53	9170	33529	17453	8675
54	25164	14048	27024	8119

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	6984	11480	12684	10358
56	13217	25784	14973	20134
57	11728	6776	23227	5873
58	8350	5046	18673	3684
59	10187	13655	72682	10774
60	34879	4698	3760	13748
61	7196	86578	9307	4417
62	23844	6665	13674	13247
63	20170	28139	16740	4364
64	13220	78310	4238	6324
65	9983	15292	10980	13218
66	19692	22482	33381	4055
67	32261	16709	15983	18395
68	18542	4451	14973	46728
69	15610	8220	9941	3940
70	25987	4825	6227	8974
71	31983	82692	4026	34354
72	9956	10201	18129	132705
73	44284	20607	6669	2851
74	24131	12330	14248	9835
75	17806	16008	11992	4994
76	16680	10949	9412	7691
77	21984	9431	7547	11633
78	5508	38040	6684	6949
79	10172	10794	49625	1573
80	17847	17723	7713	3957
81	26798	10196	18370	13756
82	18916	7193	7228	41648
83	14585	16836	53019	10576

*Appendix J. Tables for 90% Minority Media Nodes:9 minority media - 1 majority media(100 runs)212*

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	14114	5531	16748	8625
85	14772	5510	3234	9653
86	6173	31563	55201	9511
87	3863	41778	12984	28198
88	20867	8090	11116	13157
89	24075	14826	9187	6254
90	14922	27430	11901	9278
91	9212	9904	14945	16205
92	7717	15226	13452	11629
93	26280	6778	24776	53081
94	80025	3497	4790	7316
95	10646	12647	11686	13764
96	16719	7890	5957	9398
97	28259	8574	8889	6181
98	16715	17363	11954	35073
99	12169	14416	18987	8271
100	13993	11941	54329	20854

## Appendix K

### Tables for 80% Minority Media Nodes: 8 minority media - 2 majority media (100 runs)

Table K.1: 100 runs with 10% media nodes: 8 minority - 2 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	11927	57353	59766	6960
2	12588	91567	19102	186242
3	220004	29575	32976	14267
4	51256	34940	284205	27687
5	49270	46739	227616	81716
6	79593	116945	164325	107459
7	377258	43915	1512474	29737
8	13122	133375	40686	70647
9	25440	43354	46521	21741
10	59632	22596	39682	17863
11	265747	65085	94968	19830
12	29895	22101	176738	16592
13	43961	97771	1050172	31449
14	49304	99942	23375	27604
15	47675	152826	89155	71474
16	21221	121402	39960	12947

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	111573	83762	31414	2459
18	27649	73467	231780	58103
19	1224278	58292	58188	21361
20	66920	21293	38036	25594
21	245388	26622	1550805	10504
22	101329	16889	95545	19094
23	245328	22283	20671	34316
24	25864	11288	91372	12605
25	35458	21495	12611	17912
26	1459793	33821	77470	60659
27	99760	6158877	246180	6409
28	19101	46363	140269	83234
29	90945	1325469	1691809	50236
30	35063	91696	60575	357820
31	394890	126261	79063	10190
32	636228	22784	30648	403911
33	64801	47501	148107	206496
34	365363	45234	6688	11898
35	387191	129880	16104	188411
36	321032	14960	23944	10645
37	29277	665963	161694	47533
38	53777	69797	21484	12340
39	132421	21348	18626	89324
40	49747	41871	51006	31609
41	48315	70726	67453	14159
42	36409	324019	32412	217688
43	467190	45289	17356	9438
44	115923	112585	255504	12632
45	10759	38368	14844	20222

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	22267	16982	66500	47557
47	61002	569169	25452	31870
48	131751	324861	368494	33134
49	358486	19052	70696	14729
50	87104	36392	232508	10476994
51	52199	75614	10169	33376
52	46816	61589	31528	183532
53	29866	218167	8259	60050
54	31084	59967	23101	107612
55	27887	41401	96486	13368
56	1374440	92982	26457	109722
57	111089	61174	529797	17481
58	919832	39139	283799	51833
59	77544	90196	5770	27987
60	39581	26132	26189	33778
61	60533	37681	51876	5164
62	18496	36325	231106	19279
63	97954	380290	285776	29180
64	25098	17505	219832	26165
65	125973	155221	13508	13314
66	49855	31681	29853	113631
67	29420	109757	17756	48069
68	1119966	33801	183935	866863
69	47215	64052	28288	14992
70	71233	934786	57718	171974
71	24740	29545	44577	30645
72	108449	80965	46354	133874
73	12055	21664	462196	65753
74	51705	130084	312602	249751

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	36544	48299	15161	38316
76	16449	1238425	3478169	24717
77	55383	42002	41791	179635
78	76108	38262	59451	77575
79	95054	75388	391859	336033
80	44546	34807	190891	302535
81	67102	25320	158111	17345
82	34444	104320	123059	35969
83	41857	40004	12614	21532
84	41009	12784	19851	44625
85	97112	65239	91859	57237
86	1828199	292231	64016	96625
87	87569	67251	13327	61958
88	19681	84473	12420	31114
89	90446	143669	153358	114290
90	147358	53547	110894	136928
91	237296	22179	27711	149619
92	499156	157700	27618	31000
93	282084	25346	1083758	870946
94	13744	15635	147634	91470
95	94039	1103898	28279	693347
96	180155	8620	15631	201111
97	794152	54548	74699	25165
98	18669	115880	26558	25066
99	329342	412946	43280	25911
100	50860	110468	242444	77281

Table K.2: 100 runs with 10% media nodes: 8 minority -  
2 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	62465	35787	16738	11192
2	117031	96155	38255	22539
3	29208	382600	43997	32053
4	24893	14659	12834	23948
5	25637	14762	82625	44437
6	34407	279239	112688	9317
7	59738	14335	63885	13462
8	41751	294127	140426	16915
9	11608	113062	33914	15292
10	16858	34575	43326	358448
11	174400	6861	27596	17254
12	48804	21875	57773	24523
13	193054	16627	31377	16447
14	47599	10969	97968	59167
15	965971	60110	38873	14754
16	53358	54788	26117	42838
17	57136	9903	14870	13729
18	37154	25884	125548	40439
19	66419	90430	2049105	86527
20	161372	160544	15923	90439
21	17937	32397	21413	11304
22	13699	141643	57163	10143
23	27839	9315	89717	5140
24	73966	71389	74615	25545
25	34816	17509	150863	13438

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	350412	48093	90127	42304
27	493159	31305	12224	12831
28	55114	185707	178082	60821
29	36679	41104	31504	7337
30	349105	145263	22088	10096
31	854093	45622	44514	104580
32	36060	87943	131706	61867
33	48660	2377441	31514	77031
34	15227	31235	35576	32294
35	22057	29998	251604	15951
36	17047	14557	27777	117445
37	26488	250991	19791	17461
38	162420	56159	20110	31841
39	102042	104784	14157	13119
40	26685	24203	35656	32038
41	22170	25121	32602	21217
42	90633	44314	15464	38136
43	21387	55601	36513	59467
44	39179	48445	53440	8411
45	164033	12881	32872	16280
46	92494	24600	159145	10014
47	118140	147651	30245	6881
48	131202	10876	45108	25957
49	25138	9656	184702	16356
50	10129	49623	45558	3829
51	22094	21159	37419	46148
52	562660	25921	74838	7943
53	49596	177718	40599	35926
54	98165	16209	1711297	24427

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	17578	46953	43762	62370
56	51263	37611	15615	8948
57	39863	51631	9757	22149
58	34439	60505	54310	7465
59	871553	23222	12168	141195
60	2461602	163208	34580	55574
61	27202	24299	28657	20849
62	28394	28021	5204	28469
63	26415	119035	15508	14773
64	15571	17271	307189	30731
65	1337302	29128	14675	118269
66	80734	31385	12583	57393
67	310051	33595	9498	350165
68	26372	53501	32803	361550
69	26617	266145	5521	21989
70	51523	29174	31038	299003
71	17007	46467	61928	30072
72	80517	303701	81243	45718
73	62531	24877	19807	67099
74	79435	147128	19778	5819
75	22731	176185	13989	15956
76	31712	25308	21710	4897
77	24837	36512	84263	29977
78	47419	6151	15693	8113
79	31613	154735	11491	19692
80	59429	74453	2923098	746205
81	321483	22689	113143	12131
82	25781	493544	100940	5280
83	51435	25897	20213	43788

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	56969	44323	16741	6248
85	42667	21160	21172	28189
86	46907	99584	24846	273749
87	44130	7245	21384	74199
88	40894	283622	103136	35940
89	406308	645125	84833	31900
90	28599	30088	46638	13514
91	28279	50137	227701	29671
92	108388	39539	54297	60784
93	62780	38852	18363	32276
94	63300	366553	93083	162232
95	39156	169584	12375	77236
96	70220	17934	102413	96161
97	135571	23803	43908	8584
98	59590	151066	40321	27936
99	146726	10008	49187	9482
100	412638	47015	185509	13102

Table K.3: 100 runs with 10% media nodes: 8 minority - 2 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	65621	11088	87828	100473
2	51223	47950	19473	56687
3	48470	20386	36104	14196
4	23691	384314	12401	23597
5	8658	40772	100647	37164

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	25373	24284	12746	9299
7	16076	16981	35007	32531
8	374107	80309	56824	13787
9	155487	71171	25060	27877
10	1019250	22975	15515	71636
11	69968	38674	37201	9448
12	216416	142228	39558	73725
13	16358	14940	51299	20721
14	29111	11189	33292	5323
15	107424	13599	17151	35117
16	9730	53428	19027	35110
17	30953	11166	120544	14714
18	352438	23567	210016	58002
19	131992	43546	7119	15248
20	29318	90256	4742	28859
21	42796	21029	179146	198489
22	47845	91968	62655	24470
23	16887	33587	15897	20613
24	87321	15657	23935	18590
25	32259	13326	17297	17242
26	19984	17417	105324	15444
27	28016	7260	20572	21272
28	26552	26211	59538	20723
29	159472	19920	70261	13293
30	15695	14947	22745	15792
31	21649	144523	19886	40986
32	44863	38859	57314	14752
33	81314	179652	59854	66319
34	33634	21883	27212	197913

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	23036	42550	13232	68321
36	13145	61525	41730	128605
37	27802	52232	45358	20048
38	37037	17693	12335	137952
39	31065	13898	47076	16480
40	14761	56737	57581	18166
41	13420	35221	1156868	62390
42	24740	34277	18940	83330
43	26614	50971	21856	98581
44	32739	99760	102696	53874
45	101839	412577	31924	88458
46	145348	39482	10865	48051
47	20164	22646	2630	8614
48	13880	291459	9196	27347
49	15687	37203	16185	134779
50	15669	16512	11740307	11683
51	62095	14784	166772	10817
52	10010	104970	9930	104347
53	32652	3066322	23272	77455
54	44331	18136	5292	10270
55	32705	43154	2289793	55736
56	37832	19803	18613	95648
57	16004	23731	23372	66523
58	5547	1171473	50811	6954
59	70491	17875	54907	50495
60	54396	12258	26687	675287
61	36710	62883	28309	434780
62	35346	50789	7792	34312
63	31907	22899	8716	138126

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	20456	25151	13046	19634
65	75786	46515	23666	56021
66	54116	12976	67072	68038
67	42891	55092	9414	40095
68	11875	20978	51399	24481
69	14810	127500	41399	17262
70	162172	40321	14931	7029
71	29977	14169	19626	50525
72	128818	28992	34252	25481
73	16611	21759	30300	37807
74	114074	19334	26883	127656
75	71464	79929	30125	17681
76	46966	45428	20350	18648
77	17262	30552	140530	23066
78	33570	13959	90983	18889
79	27013	20047	9887	6927
80	26990	18973	35350	53580
81	764160	9303	30844	22896
82	19039	14549	2528970	8534
83	179651	26210	12557	13832
84	51224	7315	14578	4101
85	21964	18098	20452	35894
86	23992	8558	37258	5415
87	44313	26389	10470	46525
88	20006	28217	63662	5636
89	57523	75683	410255	111472
90	20497	108422	23105	8401
91	34637	96812	16236	5265
92	424547	24227	19748	4875

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	268371	14606	170849	22188
94	11444	23723	65637	9895
95	34023	87808	14318	5442
96	27971	33012	43175	11717
97	38080	69779	39437	111855
98	21012	24667	301961	52724
99	12006	26175	67262	35293
100	93543	20969	4508	20081

Table K.4: 100 runs with 10% media nodes: 8 minority - 2 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	80102	31090	27142	11163
2	12821	54950	56244	9800
3	27785	11190	10357	10830
4	21779	21517	32511	15140
5	12908	27982	14100	66317
6	16126	17148	31774	6472
7	18744	24531	15591	7595
8	10240	7058	21910	24756
9	41703	10931	6820	4108
10	28067	20840	34999	29013
11	50254	42759	103305	14881
12	147593	54988	11297	19503
13	10894	35251	10402	66801
14	98397	25792	20009	51787

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	6453	40359	118986	21106
16	43578	9404	41657	47018
17	35623	25837	12737	24321
18	41809	28153	11398	57078
19	11480	6180	18568	35112
20	25339	9542	8515	25527
21	33305	43221	82413	13832
22	31553	15726	7464	13308
23	70770	46795	19995	6973
24	6730	45646	17189	7706
25	50301	8778	17037	22158
26	21721	65501	115311	27916
27	79673	33994	29706	50615
28	90543	31418	23070	23496
29	21412	42401	16618	23671
30	90543	19753	13519	41495
31	15160	18739	19360	1017017
32	15369	8414	12624	10363
33	10407	6892	75808	27647
34	21434	18739	19690	13049
35	16199	33443	28408	9205
36	44391	8000	17979	3880070
37	13905	49284	30688	23211
38	18146	10883	17635	34076
39	80606	18020	13761	27644
40	101162	14787	17470	54001
41	11416	19607	41749	7469
42	27984	52980	6070	10126
43	40681	16369	175702	8538

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	89193	52271	75136	23272
45	15489	35565	38596	8404
46	16313	16362	48669	8229
47	42406	20597	43531	43714
48	25897	31348	7150	6625
49	16084	27882	17081	34586
50	20465	30473	82842	13799
51	14721	45358	13154	61094
52	427060	25152	17083	40965
53	22290	184034	16302	10178
54	64848	184034	175069	19130
55	19098	26802	8018	12906
56	20690	26031	72515	12394
57	21696	15339	21406	13825
58	5387	26650	10644	36894
59	14953	24077	17241	33068
60	9195	40247	29309	24540
61	6641	135620	22788	12072
62	36544	25792	30685	20104
63	34711	59376	31550	27918
64	44541	10814	121709	7093
65	17958	67573	15603	14911
66	60396	19842	33114	8886
67	6902	26776	13474	18346
68	91885	58361	39205	161313
69	102863	11886	40794	33539
70	18611	16759	118894	20182
71	18647	40843	47755	33705
72	114597	7664	6008	17326

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	13387	27173	6294	8654
74	16046	83520	6374	36114
75	10595	20326	42912	22700
76	28530	44421	11744	647139
77	176269	58819	22363	25123
78	104383	63984	14704	6777
79	39366	64792	20415	9731
80	41269	27028	10215	16848
81	19183	22388	5748	47486
82	65802	17840	17291	25341
83	44555	11972	42065	25982
84	18358	19437	16349	9521
85	53445	20168	16299	14431
86	14484	135170	64727	9893
87	19589	14502	9836	10722
88	22454	22197	13028	16404
89	34538	14109	13997	26454
90	32966	7885	20410	3614
91	13810	147074	27848	4525
92	38213	191312	19116	10339
93	11574	101523	42339	38242
94	56723	8546	38613	19622
95	83227	17184	10918	22531
96	1292612	17397	24702	127604
97	10455	277625	25722	5715
98	21439	7931	86111	21838
99	28598	44358	14725	19888
100	14181	14498	31654	46461

Table K.5: 100 runs with 10% media nodes: 8 minority -  
2 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	41539	7439	64278	3407
2	12608	51937	6591	10622
3	14286	28685	9688	102024
4	52079	12088	13185	8037
5	26213	43619	11718	6391
6	12816	26775	34226	4379
7	42323	9451	7014	10028
8	15449	10704	61552	11184
9	10943	65925	14941	33139
10	10846	17036	29018	118007
11	12814	12898	10067	3897
12	21473	10418	50179	19803
13	8168	32607	19216	6034
14	11706	23124	11672	5771
15	16586	14458	13991	11694
16	14134	22968	629998	16114
17	29136	64974	8189	16105
18	11138	9217	5954	8022
19	38238	104307	32020	17265
20	41214	25957	45262	30429
21	24600	14540	9060	31219
22	33925	29790	33846	5180
23	14638	10760	10714	11225
24	15256	14041	12891	129420
25	65708	21750	59064	13686

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	9756	14716	15566	17500
27	10970	13252	132614	11470
28	13876	19638	7185	91494
29	30064	14068	133139	8294
30	20615	11881	19385	13732
31	14569	19752	26314	11790
32	47590	19210	21466	72253
33	7211	20376	132340	25479
34	83171	11311	9425	15443
35	11739	180093	6354	237385
36	17091	12207	15188	47171
37	20546	24099	26240	22633
38	12981	26883	18655	8825
39	14857	19524	8385	12908
40	20563	27923	11712	9000
41	16678	31458	11786	6019
42	26975	46025	21233	39223
43	18426	55015	42205	11375
44	9942	8260	58588	37793
45	19434	21723	43370	99865
46	16987	13808	5933	14090
47	31870	50018	29012	9032
48	14018	7029	21748	10252
49	35375	14829	154084	15898
50	17270	26902	18620	14497
51	26566	27904	64548	6792
52	16197	46924	139436	12256
53	26434	9485	16848	39781
54	14920	8769	21745	216600

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	22681	19021	40342	31293
56	33699	17599	33958	45506
57	25894	25415	6116	9067
58	38656	16412	12379	32464
59	21988	7807	2246	8521
60	110700	15605	11210	17389
61	13643	10155	10940	22286
62	42168	11214	54530	11615
63	16150	52601	32035	19434
64	13722	6208	19107	2013
65	86690	31541	10846	10196
66	40132	45741	13803	13350
67	17042	27762	9367	8275
68	27823	13921	141750	388175
69	62570	6272	9038	13052
70	19905	23099	37726	36358
71	58571	12872	24890	28694
72	32335	12802	10470	60771
73	15594	33321	31769	4036
74	17448	38357	80197	9809
75	44403	11822	51613	7839
76	32821	92674	19650	32248
77	19225	8543	22020	20318
78	43472	29823	53287	6808
79	11065	20470	20796	24521
80	22571	7140	5335	19713
81	172826	20737	55124	58861
82	12948	28420	24740	63067
83	25546	13499	38243	15261

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	17624	15279	25900	21295
85	85349	9759	5976	10514
86	35521	14746	42203	47470
87	32504	5669	54407	12578
88	30311	26731	29011	6590
89	296582	23744	9324	12472
90	31198	13454	28721	5133
91	29908	15069	33857	27947
92	11674	33277	22427	52534
93	46439	18781	56402	6470
94	8829	22753	11930	5086
95	43282	4820	35524	66460
96	11698	18998	4886	76264
97	30785	41675	20682	32968
98	13705	19146	14945	24428
99	35783	33051	5658	12877
100	335959	50196	13261	8072

## Appendix L

### Tables for 70% Minority Media Nodes: 7 minority media - 3 majority media (100 runs)

Table L.1: 100 runs with 10% media nodes: 7 minority - 3 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	103620	85819	33750	262330
2	108969	203047	82698	406822
3	60197	1391411	102973	2212169
4	166327	57496	203119	145834
5	406067	1346342	348105	5664
6	129223	36547	183912	98472
7	283932	475271	1604059	33249
8	590385	33383	42307	28778
9	246725	4643236	1390184	438351
10	318835	897031	885058	220215
11	17534	7126905	578660	202653
12	545999	143660	32862	24485
13	248611	65441	29719	13556
14	26735	192604	512453	10529
15	888532	11112077	257297	680820
16	134387	59512	327646	26345

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	413115	42465	52322	3108100
18	97700	164695	3133704	932885
19	78544	66355	39175	48597
20	32373	27936	1145645	76602
21	111682	504538	86669	106104
22	11109044	2900938	270165	660429
23	22998	7232141	34654	193420
24	63901	96739	345229	228791
25	116962	587927	3528059	1336808
26	39122	75249	42279	1773008
27	2071207	84363	262223	171843
28	133948	84455	104494	280162
29	198212	314349	109850	155066
30	100023	878378	18694	69952
31	160071	106698	132698	97451
32	87014	70467	317835	43512
33	71020	73407	35306	287819
34	3627010	65898	259108	8751
35	3564422	2403982	569518	29110
36	12749484	126986	166118	35336
37	100809	87105	895280	475555
38	203022	253389	151782	404451
39	101460	1564439	1101484	217758
40	835872	275858	247069	101748
41	33238	23327	87178	663800
42	98104	124889	2155019	18776
43	264054	51260	853731	1679446
44	149306	10197737	10740	38541
45	123204	157756	14115	68490

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	86028	114251	45348	427264
47	48176	78419	204671	1792893
48	246648	11671432	44121	103770
49	1335499	31496	571975	51872
50	4070607	3200026	1008157	143781
51	2534980	122510	26355	94048
52	16253152	124016	816716	54994
53	838199	209786	537731	365454
54	335953	36461	93590	3157340
55	571953	90661	244033	71383
56	1110214	109624	737759	67161
57	804862	49509	60351	1509472
58	237508	614677	170126	366911
59	193985	103880	1815540	45333
60	8108146	3561427	4591788	51536
61	368946	50246	77931	53935
62	50851	11461768	220869	525059
63	128720	3859900	1400728	332424
64	1065196	250645	29861	21728
65	763252	9762777	100570	53371
66	49954	57486	55236	209169
67	330484	63067	77640	144817
68	507534	734928	569756	153109
69	118840	51854	159302	173052
70	75320	384764	1086587	35277
71	922643	79939	363090	1922703
72	40960	43529	1252068	135317
73	875727	102044	6090469	300316
74	92869	129513	111923	76244

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	2563818	1632719	249117	5250958
76	2110366	1939077	136656	140994
77	28431	158125	134058	61905
78	48267	174461	236530	9409
79	1566412	110989	48677	65148
80	104409	132178	270385	35493
81	697510	4472495	812897	106449
82	43441	338795	68779	309661
83	73748	10914452	786246	365306
84	41071	299705	51446	30159
85	1942345	120569	1831017	3736363
86	390334	513529	4714082	10838
87	548172	49328	45856	1912898
88	106607	423355	248462	20681
89	191612	47459	4083647	1103884
90	2189254	29155	266303	428820
91	23647017	475191	64395	294861
92	207906	48142	62309	182527
93	227761	979622	3254710	99102
94	92433	254943	36583	2205881
95	35580	164477	135522	68471
96	1142961	503704	259159	121875
97	408091	80399	59169	122570
98	450083	277618	1143778	1809138
99	381985	322320	193240	167370
100	133884	26057	1205569	58750

Table L.2: 100 runs with 10% media nodes: 7 minority -  
3 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	23241	116855	72721	246511
2	894	274803	24827	181534
3	37401	266261	83817	59679
4	136552	455089	74611	1594095
5	796622	92287	400986	99861
6	71582	87282	87603	125192
7	1636805	71122	425806	187886
8	22490	59767	58779	250605
9	8754450	30369	63340	147451
10	21549137	773325	4350555	3715746
11	91874	744268	42793	84667
12	159596	1445738	407066	24374
13	153259	2098868	48388	160354
14	133612	222319	3219243	119735
15	212248	8634911	88933	276434
16	195236	75637	970420	270116
17	57212	118602	792660	13406
18	16491	49194	63620	66251
19	283461	50052	93668	117102
20	99284	50156	122741	1241847
21	35670	220110	60825	68976
22	316533	1868220	16560	130379
23	3773827	159032	235557	1525749
24	8816401	18227	191952	85150
25	59660	477667	44658	42539

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	157303	43175	185576	27373
27	129118	34348	608593	427281
28	536403	109470	105503	221946
29	27656	73899	29934	163583
30	51791	514004	336757	76281
31	55382	71700	51624	16217
32	50003	52222	42316	34942
33	15885	115036	48050	15490
34	133604	81688	28111	616135
35	62478	221882	58565	43406
36	4741074	320264	66592	131758
37	26693	88112	407930	634827
38	42721	635159	182104	111194
39	40889	978482	140421	56019
40	19614	91768	94727	177764
41	108550	186325	18706	436165
42	36388	472854	44083	37445
43	48403	6571225	8083	887604
44	120333	769992	461583	183708
45	76410	21422370	14416	91802
46	135224	166846	84392	204767
47	44477	377422	108835	30427
48	876645	693074	30849	43087
49	225109	923701	85235	480374
50	78972	38625	1823330	13947
51	21671	40139	231944	40377
52	228069	77367	112838	35487
53	425210	11731	14963	16627
54	148940	64056	158836	29393

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	56529	133319	3997019	7756
56	508173	34480	54347	55170
57	24626	1083357	1579948	12907
58	60505	177373	195869	16271
59	285311	4427791	213595	19526
60	145607	148393	154121	139386
61	13905866	246320	172498	57091
62	203565	514157	101495	223277
63	482834	552766	181491	307013
64	1370291	98326	44197	367760
65	137411	175893	23082	1107008
66	1445390	225725	159061	10714
67	219101	199947	894758	148297
68	28513	323633	50443	28379
69	46373	229533	186201	11833
70	67938	1413145	188833	56430
71	123561	752745	144595	401345
72	199152	26540	2178145	366443
73	161967	107897	178326	73843
74	227025	116732	67882	16778
75	138256	52880	67460	62748
76	30234	2732816	144195	5188
77	306011	2944557	171733	64810
78	14807	15493	239249	185403
79	103190	63255	112823	34706
80	450102	15167900	307288	634882
81	60887	1164148	296943	7606
82	14275	655290	19361	37505
83	210392	64016	3730501	1425796

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	152880	191723	89028	17547
85	213969	144651	148963	67117
86	29923	129499	42273	332138
87	51744	6257308	20963	530522
88	2049111	1262889	61568	209145
89	40036	1625331	207431	89838
90	1858396	52543	90048	53989
91	199178	13157	83931	54202
92	168947	36589	224616	85092
93	493967	38702	317928	20225
94	118492	174871	35796	52652
95	2157221	191923	461823	31219
96	162503	156785	184713	121876
97	40829	1104133	21847	30679
98	24701	788578	189382	53867
99	12431	38139	63775	78012
100	97395	85225	15014	28077

Table L.3: 100 runs with 10% media nodes: 7 minority - 3 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	51705	45470	18590	76845
2	57253	209409	291082	117346
3	248924	60242	604756	60754
4	285841	20500	35171	18446
5	110500	46736	33636	118475

*Appendix L. Tables for 70% Minority Media Nodes: 7 minority media - 3 majority media (100 runs)* 240

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	500516	26061	294113	24196
7	46955	10723	16066	491336
8	143358	282870	23910	39892
9	200334	53032	184792	43094
10	50734	41690	85527	25814
11	58505	110809	8884	113872
12	940460	120698	342939	222184
13	157033	40311	55600	112632
14	70541	63451	27066	5221
15	108295	216401	83736	171565
16	4472923	54569	9109	33135
17	228449	33334	17473	48617
18	522736	134255	267850	6857
19	147891	18084	40657	10186
20	45938	140877	315305	26477
21	26320	46757	42330	5916
22	41749	29689	22131	85803
23	355265	284830	58040	79032
24	134576	50028	182427	603569
25	55654	74469	13322	227852
26	50497	275816	130633	317133
27	96056	904969	50641	39131
28	46907	28595	153611	39943
29	23300	78660	23809	958321
30	171956	18936	267610	60024
31	23549	57187	243218	185466
32	95378	27786	31423	11280
33	134830	29122	47183	11048
34	20178	33968	55053	5555

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	173343	63874	52986	5201
36	84669	91421	520020	132245
37	120129	102457	29539	21089
38	108743	288122	72308	13657
39	196829	78660	61805	17215
40	104085	47885	109447	11877
41	267377	144891	327174	73345
42	119969	889526	26821	23536
43	239377	61933	33610	437827
44	38019	1715808	21847	20573
45	24444	36340	15367	17350
46	29993	427009	91916	40562
47	44264	14081	380429	16969
48	38419	12204	98791	96194
49	10764	29996	71163	47226
50	133611	601386	419137	8844
51	182783	186408	32370	95983
52	6506095	39437	23179	23850
53	12561	35126	19646	19717
54	154739	25997	52419	5776
55	490562	15074	44367	78935
56	56213	40115	72125	475030
57	51993	92110	29658	10612
58	90029	95929	37563	102061
59	157739	49091	17832	40790
60	115250	4470696	49933	25104
61	78386	140128	166021	39996
62	68899	3669107	227980	16425
63	46518	15836	57971	18391

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	65282	145943	25538	86671
65	534910	71425	15713	15193
66	659256	62333	45114	286374
67	78096	35495	200538	55850
68	172527	110740	332384	44026
69	13018	25063	86114	237234
70	124412	121786	16954	63670
71	138265	42321	31235	64239
72	72303	51693	73166	127865
73	26681	45239	108635	201381
74	65911	68995	44761	44267
75	121725	34543	59527	5458
76	19936	37844	99874	663590
77	390853	69089	74005	140683
78	72834	59494	59598	16429
79	525611	27361	270729	337310
80	43785	84622	25083	218510
81	174921	62768	62099	63727
82	69903	36987	951579	128966
83	47647	24043	11107	17409
84	69129	58404	205837	113081
85	102941	133435	17176	60457
86	40203	71544	70557	1874182
87	40980	81026	312674	84570
88	878512	150675	10042	80752
89	40387	48876	18598	25473
90	135897	61502	142653	9478
91	122079	23471	44253	25134
92	98291	341703	63057	1130398

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	103037	19041	34748	34821
94	1177772	19591	93957	117583
95	1020321	41820	41748	42712
96	2021431	44051	32803	35206
97	102268	92343	69356	14985
98	29664	16600	64907	52361
99	63533	94414	17860	43533
100	321175	12272	30016	62417

Table L.4: 100 runs with 10% media nodes: 7 minority - 3 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	172735	114699	31500	54811
2	93839	360567	28592	42891
3	43585	31335	22453	103398
4	20882	54279	51854	221446
5	14202	844464	39396	96024
6	203943	17633	146882	392622
7	90289	58135	35536	20674
8	78343	147598	44006	188585
9	52490	124128	7809	23421
10	23465	8682	48220	21983
11	34622	63734	14916	5589
12	26670	24391	18006	30686
13	35256	890842	106580	85949
14	58383	25696	39582	30124

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	98554	11911	15017	46852
16	60666	51071	16573	68380
17	27505	62466	27930	114149
18	205513	117359	46340	32863
19	39335	36988	274569	6672
20	70225	23527	286426	188009
21	31243	21939	22915	691686
22	359815	1669662	21417	23256
23	32680	104094	155706	111328
24	204834	483797	13635	48470
25	51441	62014	14504	382446
26	449916	49678	123302	36306
27	60256	37086	79541	28044
28	148180	68534	22105	2454
29	227357	44755	6000	21368
30	28301	25117	18044	48953
31	56578	55803	45145	28702
32	92422	100672	94072	15442
33	208813	6794	11395	388550
34	1006205	56392	30466	3746
35	121889	246519	18483	143560
36	119100	25387	1043808	16230
37	105236	99136	11959	49870
38	16285	47171	30482	30422
39	19169	406502	60683	590584
40	893941	333279	15290	14886
41	1162040	132403	17211	304891
42	252242	1398965	15498	119937
43	19604	11881	30871	19284

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	58868	75880	31025	21104
45	20754	22384	27317	10454
46	34447	204132	201456	14930
47	32912	36843	48689	87620
48	20789	150510	207374	113785
49	66915	39087	23852	11480
50	89806	135363	389207	19447
51	7670304	38072	757777	3385
52	66074	171195	15564	60836
53	45910	319836	106770	49780
54	6331	56644	36452	38149
55	36286	22845	39192	14332
56	28717	180567	72939	5246
57	33353	62794	74392	54606
58	77842	22321	37735	27519
59	15809	44201	59112	26411
60	64502	194830	10420803	25441
61	98886	50538	271468	12704
62	16515	96974	140834	67996
63	38435	30249	165771	9402
64	88938	79630	30490	41593
65	152672	546309	603841	18597
66	5822802	32872	194504	44240
67	70561	36184	56375	432999
68	100947	42365	29470	390135
69	53273	65642	18005	35955
70	160465	15478	115321	25882
71	98902	58472	11278	31481
72	77191	131290	24975	5892

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	58753	3512437	10353	43263
74	940675	19846	129008	62357
75	35964	149941	13308	589737
76	421097	566873	22718	834640
77	31100	28877	66743	63956
78	392545	71492	2344513	141355
79	44613	33613	54257	9365
80	56453	79851	39023	33449
81	17907	136081	156013	5599
82	65192	61910	16193	43633
83	47273	24868	24590	27074
84	122538	51695	43878	29719
85	1838930	31146	18473	143421
86	91638	77838	28505	48430
87	28408	47771	37259	197244
88	398923	38554	106498	28785
89	80388	44047	87036	138238
90	28074	10722	92972	10343
91	1644804	157640	45493	14328
92	86203	460822	697345	104059
93	31768	74702	29401	27968
94	14020	23771	39017	72318
95	78635	28074	37847	83989
96	88215	51358	6783	15811
97	345116	17531	8874	35122
98	40435	50837	995963	5012
99	30854	16385	469033	110482
100	11924	37178	10667	20222

Table L.5: 100 runs with 10% media nodes: 7 minority -  
3 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	55787	23630	35681	13798
2	113289	16969	21161	75382
3	54188	308238	62743	520549
4	291997	19758	8729	65638
5	91731	70353	7270	13528
6	48331	22521	25653	7754
7	88555	121066	511166	11701
8	49553	33941	15135	21247
9	24407	96455	5814	10358
10	151652	1664443	17412	63703
11	65607	213136	256654	38848
12	150849	15578	127546	31331
13	47075	53318	19086	31458
14	791672	22688	21230	8323
15	41366	18633	23498	20862
16	31727	92954	26129	77074
17	58929	12293	46214	6539
18	18614	7414	62558	5157
19	72859	47255	51146	27309
20	46816	16715	9914	68996
21	522933	25396	71275	18935
22	210820	48696	20182	52381
23	27109	3287218	53056	21419
24	51079	199227	40646	21419
25	321898	35730	193802	136907

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	23853	85576	16966	1223536
27	1996155	34002	35794	203558
28	71274	30922	34026	35920
29	597837	44221	69511	27888
30	78608	18841	46808	29362
31	296172	201833	586524	7583
32	25681	108377	38616	24180
33	11976	142768	56681	3313
34	95630	75169	18984	45003
35	22131	1069003	8337	90177
36	74818	153537	39292	506249
37	379318	48435	24861	439919
38	7088	17253	15073	45336
39	993271	48559	30790	20237
40	65684	150712	66742	129065
41	177901	49349	106980	46759
42	21218	434356	50710	4601
43	29905	19868	39581	93110
44	57471	583948	594139	317241
45	460542	29224	74301	61513
46	25702	116059	25571	113811
47	58649	69149	25690	12242
48	196879	51525	116973	10592
49	449727	17430	8634	13438
50	24223	14420	44058	171628
51	23607	374425	74875	63107
52	45256	5819	696680	63321
53	25745	126695	43194	15285
54	6760	26920	201839	219698

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	31740	48705	93573	254838
56	32000	323370	43499	18501
57	54407	20579	83743	4927
58	58649	51091	57014	36343
59	29829	18406	36569	25733
60	259164	33334	9581	241410
61	77811	107813	93931	33661
62	273992	34104	50512	61554
63	39502	53658	412440	82358
64	28456	16608	19204	184280
65	8244	31758	19636	6687
66	153927	317652	100036	12562
67	6106	234056	184451	10246
68	186868	170194	53755	7184
69	98247	48255	19624	16220
70	308442	750647	98049	40476
71	18820	86605	28005	107159
72	109964	259477	13734	5367
73	20476	20510	54123	22238
74	141671	61887	24267	23447
75	16210	2259796	27569	13194
76	15731	163956	29857	13782
77	22956	57513	235575	157050
78	30855	36164	125318	12955
79	45469	35782	29311	8273
80	66477	3872138	14812	57288
81	23563	16043	17945	2610
82	102838	34279	86693	53472
83	24784	15382	35147	23731

*Appendix L. Tables for 70% Minority Media Nodes: 7 minority media - 3 majority media (100 runs)* 250

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	20619	348869	45060	34758
85	97938	19406	30486	942742
86	163250	38356	976786	60957
87	567474	31763	12852	43936
88	16665	45671	11830	76392
89	44546	117263	20020	92608
90	14169	197299	121463	10656
91	28699	16509	23511	80658
92	128838	127032	61643	35022
93	20603	24435	68589	7660
94	35079	37420	40700	269116
95	247701	41360	38793	18542
96	48973	27596	69403	572914
97	159508	42533	13357	76979
98	97460	244006	77371	4829
99	634080	27625	61559	10035
100	59668	100764	9287	60189

## Appendix M

### Tables for 60% Minority Media Nodes: 6 minority media - 4 majority media (100 runs)

Table M.1: 100 runs with 10% media nodes: 6 minority -  
4 majority, AND = 6, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	875170	1927539	928021	130034
2	606551	268038	923863	47471
3	582123	63674	742952	68725
4	209109	1642768	2279809	192525
5	142856	3842005	725351	3456098
6	1636865	4192634	11832454	1943059
7	1952503	337644	200668	152941
8	490920	579978	3701579	543104
9	9333355	177763	520368	1075501
10	5519175	1129159	180277	1968608
11	584010	849333	165549	3833755
12	727986	88444	65367	274969
13	7454782	9546	206903	345987
14	9676354	65867	815912	203000
15	814701	2555472	1320237	799242
16	376739	398846	94897	96894

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	4959922	155050	140490	8535
18	52813	1263138	36684	138095
19	7052773	293327	806748	105421
20	117727	55008	121403	862960
21	96068	1641238	116637	3857652
22	6256244	333485	32412	3410548
23	131153	267179	17762	897931
24	140574	86085	47070	76077
25	85767	158471	330380	830299
26	104938	28911	119625	3545064
27	4373739	115804	112906	935196
28	493804	258647	194267	362054
29	706555	145238	396527	752129
30	149844	96063	66212	262475
31	3421342	755561	1136436	308522
32	429704	162188	61933	1615945
33	2502498	574619	1126108	1365911
34	234121	352910	638214	1837317
35	618814	305502	169913	162582
36	561297	323508	1491445	2380748
37	2281711	609637	123169	132723
38	411863	139350	134049	912753
39	1845374	83119	801204	3072450
40	79813	693435	647816	213041
41	66244	26367	156169	1069978
42	521447	541661	152418	4826972
43	736724	66594	214989	29767
44	1374576	2060483	118542	2832427
45	657461	323271	1113885	656516

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	89284	234703	1086421	65553
47	1129722	305362	238535	236196
48	182003	75036	149889	149359
49	369556	2359390	1535044	3358680
50	928267	1706072	2296296	2138210
51	1061600	1088798	306908	427024
52	3468193	45423	98865	535140
53	2621598	989156	118108	1114696
54	1076744	378615	1028928	2074448
55	177564	861544	47364	303969
56	911672	3111429	658925	160743
57	909669	1905312	378417	329775
58	287688	991831	292399	349001
59	69952	1295235	88656	50251
60	51454	66887	84132	66261
61	303269	705515	259453	361344
62	273906	159549	2614755	68494
63	1255893	208966	1683499	239705
64	1936056	42310	1698255	1423827
65	1504531	440024	565464	3943610
66	230372	98833	201948	190648
67	889630	399635	32051	141996
68	43139	2886774	23389	528242
69	1469416	634882	1309215	783159
70	1241646	1571127	847949	154498
71	865884	904668	2309644	113429
72	148910	4309180	499266	977207
73	67767	3270243	20607	74575
74	105023	3550236	1072777	117245

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	133849	1045903	23285	535630
76	998334	809881	109960	255248
77	248290	426951	212839	225808
78	981048	2254210	678869	303863
79	64439	2305288	27738	114012
80	534026	854893	259149	762244
81	1619913	114220	216355	253400
82	287673	66687	19112	113199
83	317027	298980	215013	908549
84	434691	39869	1056371	210870
85	1116722	585285	162536	1927308
86	1836215	96398	97840	177037
87	21238	3307437	186536	231656
88	2479280	3727479	1113405	2686904
89	610586	505846	863564	1763865
90	2807850	68476	211648	141905
91	377093	1090783	429884	9851947
92	119802	167806	1431255	5353170
93	1169030	346574	377046	603408
94	385375	139705	1369408	106114
95	364319	60919	95996	2900395
96	223154	4146352	281143	3121974
97	359697	387860	110178	5614034
98	305968	89397	51670	186862
99	1731183	604150	292078	204337
100	250241	1690899	422246	623504

Table M.2: 100 runs with 10% media nodes: 6 minority -  
4 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	173978	43842	54898	596992
2	415823	276705	275430	329601
3	34543	277182	764473	372381
4	672166	28077	830494	44185
5	239709	84029	156950	715301
6	505741	285784	2109428	1156899
7	243265	65191	280378	146109
8	2451782	561263	609216	288190
9	284568	164383	166003	2941007
10	1866300	870578	268177	127601
11	146196	87648	774173	171237
12	125838	280446	201277	692513
13	939957	690275	115306	316352
14	2606187	134114	1681057	753079
15	36271	158318	96242	378388
16	106551	2138805	48909	117306
17	175877	3699629	893148	441195
18	980357	89260	2680810	48663
19	55226	4335988	2612916	218714
20	571078	3239879	122844	72297
21	138462	45853	88015	68733
22	195270	55441	1346335	960609
23	5696861	2486479	55380	810434
24	24287	159462	52789	98460
25	125840	49789	2707518	177908

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	2675874	170758	293501	1619837
27	124851	117537	3626595	40437
28	5859184	1679678	618913	250800
29	464630	1951768	3806244	157495
30	104504	353876	51215	1273395
31	82457	157563	1563418	1056674
32	311589	46965	4238336	703494
33	6109573	411647	87578	95414
34	1206682	422104	74089	4692480
35	2473740	308612	1086655	587151
36	194940	1852094	3714415	1917007
37	260090	533714	2119702	1087999
38	1512491	372240	1731158	2928598
39	1691345	346544	271522	524612
40	4238792	132763	251256	2951966
41	8957501	3225640	1060492	135265
42	485910	671200	459869	51220
43	140645	96789	1682213	101754
44	175948	102613	188361	3105524
45	384247	924301	873670	731999
46	1525757	122849	162312	1504620
47	92808	394871	2125336	485084
48	128126	188069	89725	200399
49	442103	669523	203410	256922
50	548761	192293	713912	508385
51	2920768	1390196	239366	189850
52	846687	2080745	650479	67858
53	83613	380650	328094	125684
54	1589192	378628	82828	1716615

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	3096350	1968627	166389	39794
56	114473	37222	90654	1587560
57	1569051	4281729	101641	2680594
58	6619004	1234067	73287	1738107
59	202714	115454	281535	92262
60	4507473	862812	674747	103068
61	55095	150014	417211	20619
62	158342	136580	346150	9401
63	3236909	59747	2296227	179229
64	145410	3393025	163525	191291
65	1815190	161563	121820	2508974
66	4112912	185940	29777	729960
67	4460073	4735803	83154	1416239
68	1925790	448155	2780813	851628
69	8134480	78889	34532	270640
70	2708550	114574	86620	474429
71	4078015	24776	185877	612881
72	1211866	109027	881585	131616
73	3757522	2593058	309933	162368
74	985364	5896409	1550420	73604
75	198001	109341	840809	3746987
76	263399	510717	411784	3287669
77	121118	539910	54108	62316
78	1864854	495750	554893	4152879
79	33046	680585	52468	196380
80	452253	1906768	3452404	1066553
81	82352	108787	400698	94437
82	24761	970093	75045	3579805
83	1326414	262370	268666	1075284

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	5041239	1012294	73762	240693
85	617965	96205	696677	233252
86	89363	225909	32556	485435
87	686321	25448	47326	49712
88	586215	131758	107707	597127
89	698648	2022452	931082	2297483
90	34491	671788	611133	179436
91	108793	742482	18469	228414
92	3382537	920739	1485337	591968
93	5030784	1642717	119855	734316
94	293383	294877	1011760	4266988
95	162383	105305	940412	369116
96	1040152	40894	79523	386308
97	1045150	343564	3487589	537811
98	2305880	2479189	195890	246395
99	33756	77730	2461809	1037265
100	88082	573671	71492	847666

Table M.3: 100 runs with 10% media nodes: 6 minority - 4 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	285499	427110	30553	54343
2	336047	550074	39479	243069
3	978061	147638	114309	674131
4	805848	990813	118443	2964853
5	61111	201018	211989	16732

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	2530430	80457	301143	181541
7	298506	2798193	948024	193198
8	483235	544481	380565	794727
9	719562	338217	562904	789217
10	87738	203537	145410	264525
11	362094	757721	88394	114179
12	3031094	169857	7307765	45891
13	1027713	95784	208931	49931
14	95558	2573061	37051	108227
15	49454	524945	177281	10884
16	3713249	84688	30181	93126
17	57144	1380106	865226	6983871
18	68436	613086	170989	7083595
19	33883	418222	968053	1492271
20	51397	8802930	500602	672645
21	47012	59076	194688	34273
22	344834	6926099	258429	40266
23	34798	156352	235396	40121
24	2238234	1747207	158740	66593
25	1362260	467474	40099	1647902
26	126613	341271	87979	6527052
27	279413	62163	72933	553803
28	2886838	232767	2420178	413879
29	2919774	159546	1282472	489061
30	438882	92575	112717	5553343
31	236753	159096	957576	1222119
32	132497	632419	631047	787649
33	279265	326366	504743	156102
34	97228	56290	415442	9092195

*Appendix M. Tables for 60% Minority Media Nodes: 6 minority media - 4 majority media (100 runs)* 260

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	348286	101104	111072	141373
36	5338748	392882	73325	757583
37	125771	155576	753651	451682
38	5130329	183560	87024	150122
39	722653	3395028	1075067	234949
40	3484129	5676791	677600	1257512
41	26737	205796	63064	2189864
42	7715123	1843209	655005	14460534
43	261116	3221330	220191	66513
44	68314	5383969	106534	18708426
45	255436	97195	501854	2821497
46	161647	1871644	1808659	1034010
47	34511	44612	31067	313230
48	1306643	3718492	82778	328834
49	75162	240047	1943746	3781760
50	56595	532964	606107	373440
51	1164656	65763	63766	323386
52	1577086	125087	239181	93483
53	535284	56339	143518	334947
54	3805678	405058	60515	760584
55	1811863	104999	980909	5981
56	59622	174866	106328	6649
57	224589	975622	245937	51811
58	60608	1254861	59170	12066
59	151300	2200134	1871413	955789
60	158021	62205	859240	1035545
61	66734	1070856	1935178	8514
62	1949022	1824468	4010165	131709
63	3179958	3017837	996001	39684

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	226157	28218	55650	1140496
65	32256	880003	2929055	2568796
66	549544	166695	5744566	418411
67	331962	112587	989401	521410
68	2430692	8650020	1172926	236852
69	288391	488623	71704	84872
70	148455	88524	7020300	9882
71	197143	46355	39070	507925
72	42881	3950414	36725	52886
73	1060548	159984	1109665	166707
74	199964	95958	330094	4448909
75	382524	91390	35862	1138524
76	210508	48527	1256845	98470
77	1666030	145890	1952228	4434242
78	105398	924110	4741109	18355455
79	409797	44547	873731	154233
80	483681	14351766	34917	206145
81	221622	79720	2951277	580382
82	46836	81127	169440	84537
83	423961	2737226	25535	306833
84	322983	1237285	45708	285078
85	605350	112487	2573689	9645653
86	43114	646431	548988	287978
87	363835	31267	1033589	11672
88	171204	501739	575064	82147
89	1000811	348961	335125	630921
90	67032	100019	242447	194460
91	81258	1097437	3351718	55764
92	42849	43747	1164002	6219563

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	94295	2952597	140531	141444
94	706501	38361	67371	11065
95	29707	593308	1935323	56608
96	386663	80858	232497	307085
97	460291	50760	78963	1369560
98	1519483	387347	662953	1034245
99	131362	782158	2697376	48460
100	110852	545640	3164166	1657026

Table M.4: 100 runs with 10% media nodes: 6 minority - 4 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	22046	58497	20472	310117
2	167666	125357	326989	95205
3	950584	23827	154220	453910
4	2609021	195021	25361	58211
5	622893	25301	179312	307784
6	28036	27024	298006	20246
7	48897	1121755	111211	27554
8	320583	44252	191324	17395
9	44193	382753	30470	176515
10	75131	693783	24595	498244
11	171437	30336	281852	165566
12	153858	393903	1175765	32804
13	47872	172255	158393	30632
14	199175	230762	136719	188043

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	176760	2431050	270032	184755
16	172822	302871	94616	777477
17	227768	796054	63490	31196
18	237391	31358	1301814	10140
19	247763	5961742	145039	211037
20	50022	834327	450432	238368
21	86540	1622640	46955	330194
22	403072	267768	255882	490105
23	71743	69612	40496	54884
24	61969	223927	66705	270409
25	609812	3553899	176953	224398
26	149209	9470793	63733	4192502
27	278018	143593	66013	27448
28	79949	136348	46420	1408953
29	320868	280194	553175	158762
30	126149	157831	477137	151302
31	138982	306350	265971	1937136
32	823611	222765	527825	54204
33	53227	58621	973250	238609
34	296815	530172	153429	1119257
35	138805	7479	261221	108619
36	24575	542436	34077	112272
37	111943	149746	53835	962319
38	249599	3113130	162191	986255
39	1325162	1348611	66318	1249915
40	259259	1040155	162692	12095
41	61573	9028668	20068	771853
42	96070	15327	47159	72181
43	183722	229073	446714	1171330

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	1391460	52936	4231081	233043
45	12073364	256808	93107	2505383
46	41750	6940971	211964	194599
47	45105	414121	587365	1384080
48	120833	60840	126778	133445
49	621320	252649	71133	117338
50	19035	98687	22603	37265
51	55815	186090	16946	1248353
52	101769	32526	115386	1264058
53	83122	228803	124897	159016
54	147383	70867	45697	28327
55	367694	41850	104407	65205
56	97896	64456	74505	6074
57	37809	44644	2002762	15132
58	618473	16714	4053476	293961
59	273657	28393	61989	23948
60	141149	107117	48642	141766
61	498909	42923	3610601	5603643
62	261477	191577	8822722	621429
63	98034	24260	146328	91634
64	64139	82039	167330	135493
65	57568	178152	180555	3514073
66	187826	167956	73703	532591
67	107528	414251	36414	1200676
68	49322	346158	60236	557475
69	164337	19059	23936	4912778
70	58008	98483	162222	1710884
71	127418	170279	88790	1764554
72	1036965	257474	156739	55139

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	698634	33805	510394	393841
74	29708	158455	3338822	158732
75	373548	45521	1444156	155148
76	59954	361348	65359	10214
77	223369	40393	3978220	1827742
78	1263689	153256	61130	61705
79	2385027	385088	20324	250963
80	190101	276550	613764	53021
81	40912	803866	13572	261569
82	41198	303124	41897	49272
83	502728	3187767	36929	132750
84	93122	1316427	65003	105558
85	128935	1122712	105076	499561
86	41176	1220426	194768	633090
87	1296506	1362950	1027085	61902
88	40600	565931	93305	145934
89	370746	100986	1055798	419413
90	252336	16021	249608	88102
91	43076	74599	192835	5951
92	1518711	578464	21200	86259
93	63292	95087	164194	64744
94	53172	1599829	5708597	89525
95	60489	107854	22215	43973
96	3075010	54919	156661	239192
97	80248	413859	298748	307955
98	185030	53467	35568	2585449
99	34200	65978	589302	758155
100	313433	145573	193608	11129

Table M.5: 100 runs with 10% media nodes: 6 minority -  
4 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	157573	90001	335051	217776
2	183156	161214	55947	86082
3	86322	21205	62191	18433
4	50711	75329	113244	23704
5	615385	48955	53737	83445
6	351439	78149	45253	30002
7	39975	959083	1522611	278560
8	107646	142570	69352	35462
9	80166	43758	498965	48936
10	110328	12682	46565	22957
11	101906	122024	73625	40067
12	40126	121167	98226	43254
13	379929	263300	546648	15914
14	201410	158934	76776	13949
15	33434	41755	3154647	542006
16	248050	181950	1315824	24824
17	46890	351382	60911	33217
18	47458	396880	722032	163256
19	161190	15992	51862	638939
20	21635	40090	118155	103326
21	425794	422729	1139033	13981
22	66984	104930	41509	37725
23	1365714	156213	283023	80048
24	75232	90969	167122	323479
25	55842	68573	588311	333705

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	168702	806305	60385	138230
27	878793	202069	1633426	1917070
28	379614	157371	17329	1171238
29	302960	30620	67066	33711
30	212622	176444	166316	217756
31	14469	37789	19057	15261
32	63536	315806	13242	272016
33	37648	299364	113013	5545
34	250795	56765	52253	47574
35	189999	115274	118337	201808
36	1403983	35010	78041	66726
37	451567	161810	314827	358229
38	76024	145272	46179	744828
39	96514	82819	20089	129432
40	602745	45443	24070	173375
41	28487	1191270	74931	430918
42	28067	57536	573023	306544
43	374172	129349	252894	18922
44	85500	1793805	58934	12877
45	347961	193527	268831	890275
46	2065684	39112	121396	45383
47	1403812	193271	12735	162053
48	61918	147262	16374	525336
49	133185	178607	131621	95817
50	53896	1641876	46431	100435
51	70143	110408	1700145	55895
52	788379	761540	525073	114671
53	366643	33365	78193	50903
54	261110	61477	17402	574056

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	71673	125962	77176	118828
56	258386	141425	135421	236811
57	1327756	123844	57314	1141517
58	35240	294394	71602	273866
59	38406	174358	235412	8638
60	228386	154918	144116	35589
61	796135	180622	33669	59005
62	47849	2792738	330471	2726409
63	213859	20502	86913	105715
64	154935	36588	332568	132814
65	91430	118852	149871	2775672
66	25210	6168651	37788	247534
67	99788	119543	161176	1199746
68	849829	106460	308537	12264
69	3262575	140416	50414	23138
70	6883122	5020490	116389	63586
71	8725917	37125	456604	52357
72	37916	35954	93435	20391
73	1760485	24097	63820	257272
74	552710	24141	107980	308811
75	23664	58829	481983	392637
76	23858	55485	299762	20311
77	148589	1638050	21364	271785
78	959436	153524	106932	83853
79	176851	136247	41069	161990
80	839607	208991	52903	235688
81	2260689	70175	50718	291856
82	962064	374877	72133	321215
83	25279	196348	32084	178584

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	24425	142367	394356	107494
85	38688	480410	175678	26308
86	85871	23729	25867	118637
87	114735	95322	43669	49308
88	34894	69481	32665	229054
89	68280	664499	322963	154657
90	22840	44435	79680	170278
91	58165	25624	53794	11148
92	87469	26055	271873	1404496
93	182639	32383	693533	250934
94	309856	126877	50504	627450
95	48082	116201	23058	484262
96	38826	153491	65228	55981
97	233493	44417	138759	16018
98	106660	86752	549856	6224
99	1845196	38434	70771	129518
100	96166	194861	14486	48161

## Appendix N

### Tables for 50% Minority Media Nodes: 5 minority media - 5 majority media (100 runs)

Table N.1: 100 runs with 10% media nodes: 5 minority -  
5 majority, AND = 6, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	150603	284416	1168063	2963065
2	323867	750898	3949394	2895217
3	83377	358752	992355	4212959
4	188477	801303	740049	3067060
5	468234	474557	3637794	546506
6	3733193	506681	677959	98236
7	3324324	239742	919884	9423153
8	1664838	1436091	1047795	189932
9	433374	207057	342374	1012517
10	1874378	4541306	839856	504675
11	3809195	850730	781289	3099431
12	771109	400894	602119	16709
13	437779	1813977	741942	4851913
14	5708296	1010977	1376483	588350
15	2480060	202342	95034	4217837
16	4682247	710269	2535922	1008658

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	1684093	4493481	3787434	2290525
18	273543	3398697	5417614	1394347
19	3751110	3853364	741036	144895
20	917739	616341	1251942	2225035
21	714609	1453042	714036	1491051
22	824392	562780	4953078	97161
23	227071	623923	799666	685348
24	102053	108071	3930819	440213
25	1899160	2981411	2690228	4397508
26	234264	1535429	765945	2532527
27	1485444	473257	220404	1147404
28	168451	171539	1694327	5513816
29	2900596	1287410	3272173	1324898
30	10086765	638980	1457681	1425100
31	6620625	2751050	1826143	4013230
32	2570850	1283689	2195062	519434
33	4411900	3544208	3635195	2630819
34	482516	1158925	228803	296068
35	5515781	578672	8865149	1738243
36	246937	202182	600808	4610830
37	1622108	793462	1585346	7187030
38	540209	261644	597177	1227787
39	6188259	1678537	27054	38930
40	511861	2787680	159844	3833774
41	772161	1417852	739495	328734
42	3656597	2021325	481250	3160389
43	7523874	613210	4281578	2804519
44	102322	1798206	3638225	2504731
45	253011	4062009	116547	543655

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	580653	693014	303131	170241
47	3967896	243434	1364543	1418380
48	1141817	3015084	781019	4927539
49	160976	2035062	1062134	469457
50	135567	4480685	1376981	1505701
51	763695	542264	4955808	410925
52	5951056	3891956	2037551	3260703
53	3486572	4766289	510917	3476582
54	607783	749900	2650020	746015
55	847208	145095	3302603	366837
56	652080	3669881	195465	2865179
57	5450556	1903864	558862	412082
58	154736	2108000	432783	29327
59	353852	2836683	164675	214338
60	249520	4957957	1506879	3368464
61	2435007	893677	3869429	1532848
62	771641	306079	2833954	593144
63	3852984	319098	2909556	1508022
64	318469	1550152	3693663	251297
65	8486507	689721	1437097	532683
66	1919931	1483181	1596183	815018
67	582685	885061	222542	1262163
68	2871402	4616044	1050571	4933796
69	3167324	2619680	365057	4548411
70	4389114	3292902	265156	7319643
71	3790602	189207	12890	785281
72	1602964	709315	586688	201595
73	1487990	2252243	171248	671256
74	5167418	166252	2343486	541593

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	5882908	417114	8091592	233833
76	735250	1934657	1904657	1684055
77	240468	3466119	249450	958690
78	1744486	5180044	406751	1770125
79	3150710	2608892	2277069	239478
80	2107701	298498	109200	1515083
81	3055163	656560	126817	1835938
82	4066968	346440	323433	133462
83	320138	566426	4742167	4939244
84	1174371	167465	470216	5244770
85	1627226	273450	495674	1453385
86	1616955	1176607	2075405	91070
87	2031583	162188	199023	1240847
88	4077819	257324	681887	1549404
89	2896408	945938	3528845	618962
90	1558388	1382756	5372249	1050764
91	1053032	2936599	1143793	2967656
92	367237	878579	5269404	59932
93	4604902	68635	811581	389095
94	2892643	5470394	3102183	2222021
95	2072336	3834774	2678299	887454
96	442294	966190	1732874	4631607
97	424751	4159953	403964	3545228
98	978982	273729	240553	750733
99	688840	3395458	535031	3270599
100	3017474	41921	1277973	5923830

Table N.2: 100 runs with 10% media nodes: 5 minority -  
5 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	929026	1100542	128601	2107422
2	205082	462543	239472	5269794
3	2269155	1026372	439051	1691037
4	2097491	304269	1318813	1284525
5	2178863	126477	269329	3783620
6	1566278	6724051	2252048	185271
7	1350278	158940	2036435	3518304
8	2605207	2120857	2175972	4347241
9	815367	2550376	156551	617852
10	1180116	24013	2637791	85542
11	1013319	1948176	242876	363140
12	4236591	1015039	1016969	231310
13	1529806	130176	4440938	113606
14	181561	1789922	669730	1618613
15	2158402	954381	3573659	1220252
16	1266955	1952306	2629482	446725
17	364701	3720708	829934	3220398
18	219543	1754191	3369368	4913906
19	2967287	4271811	339198	3391854
20	3082328	1477971	627225	3110224
21	69204	87533	2160981	1943657
22	1224609	2793413	452695	2945012
23	123594	4300108	3222262	269896
24	397399	2725194	562723	964037
25	73464	438624	1098432	1992450

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	822127	509527	1634607	2622037
27	575544	538491	191030	363795
28	1761115	92328	1308902	1129584
29	1451340	1281138	56511	839611
30	1631632	336983	294813	101492
31	4241408	1853129	2767044	1148787
32	54671	470648	939457	385229
33	903000	5008396	4706571	73277
34	6272413	442259	277441	995634
35	5427165	2895224	65232	48620
36	152112	3094744	3161651	1119605
37	130686	1622878	521580	218405
38	1139285	32349	2564022	779169
39	5515938	1118920	66592	3817102
40	175560	867095	1137593	140682
41	51779	1400967	1535968	2823982
42	519137	111802	166566	2535623
43	2231080	859314	628235	3297537
44	1626636	934803	4461188	2707803
45	1880453	770992	501131	758768
46	5677775	1678998	42246	555759
47	4555223	84064	231149	300017
48	124166	2392924	765372	548836
49	594337	295608	2848126	4512262
50	1067408	241435	701759	1021979
51	1377258	61760	91744	539133
52	4841984	449093	1330980	543675
53	799426	446850	508512	2531472
54	493319	107029	1046078	334606

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	1145834	209060	226415	2428477
56	457245	216098	589718	2906287
57	517989	5165974	2478308	1083790
58	498024	2834610	1476126	1482142
59	5145850	1765295	1680934	169946
60	2595793	4351525	343267	11414
61	2646512	1772374	1170838	1476776
62	4410528	3431802	2259679	2239021
63	203647	475448	484892	4788710
64	4550848	81633	606894	2388511
65	3647350	277812	224579	2023265
66	425008	376279	746772	3378958
67	601154	134099	2983468	61043
68	3714857	2588557	2407758	316301
69	2454516	281816	1008576	428146
70	887835	2474697	1952649	4587580
71	4449821	254826	1010098	2252445
72	674691	313391	1186187	67136
73	1441442	436959	2901163	5059750
74	1306771	3043666	512188	2421656
75	597087	166402	379434	827026
76	294879	872012	475164	45620
77	341354	1120022	2360166	688920
78	1182793	67284	285608	3849922
79	295993	2141812	718088	4546929
80	1003582	2610655	1759929	149071
81	2294938	5179585	363817	1737247
82	4462035	3575495	197217	3689245
83	246042	411503	2571268	2362856

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	2116523	1073346	129312	2717419
85	1735340	572587	187431	442481
86	209795	751538	474273	84585
87	2678950	788296	4694692	2360349
88	514071	1201160	531041	5081252
89	1231471	3678220	3310884	1186633
90	1082198	346077	435632	759566
91	3367263	312262	1941093	150513
92	1117843	920457	4782549	807894
93	1098328	1021405	187473	595967
94	247567	3344501	3222550	1035760
95	894484	1941910	748193	2041738
96	237669	939959	4257538	937428
97	778017	218036	2547353	1275483
98	200713	2570863	336868	704077
99	117917	183495	1494181	757221
100	3429391	1396913	1591156	3390805

Table N.3: 100 runs with 10% media nodes: 5 minority - 5 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	2422403	3276556	466820	4003465
2	1989542	422142	1249596	335141
3	551323	279240	693326	3108380
4	870642	1420409	2886832	1649386
5	428050	207871	1045243	178449

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	855135	423960	820348	284611
7	304336	283253	172110	3172421
8	2721060	3757175	4343878	1870675
9	3407479	208572	1428363	4206754
10	1200559	244835	302357	1144424
11	1313531	560110	10261956	827666
12	214055	270242	70514	990222
13	3588716	1498484	3303888	314889
14	626739	1193240	311828	230483
15	1579485	677025	2213797	2717154
16	500274	378093	993777	4502722
17	190309	1914963	172961	5101523
18	4329473	941862	2921791	1705901
19	748546	44192	24721	96537
20	129833	277276	8984046	2795689
21	883892	1369743	1059996	3384379
22	1397457	917781	42439	69305
23	389482	1080950	1097105	1936925
24	628351	195988	78823	385154
25	203348	60489	701857	2124465
26	603812	2564299	1392960	152582
27	4112418	68808	1130827	2611669
28	1101072	168681	829320	195452
29	776226	1851459	94401	28578
30	465557	179550	93422	2010952
31	1073206	4001147	142251	2376263
32	3391092	155486	5999002	62123
33	205769	600405	220401	154754
34	261143	1267568	3514461	1396366

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	4373375	1716592	442837	180751
36	283870	194198	213781	3115794
37	116579	806167	1351082	116656
38	450071	5585161	24527	426175
39	1213167	175756	2317758	3460962
40	93951	751241	81856	1613689
41	164940	24079	2030302	3864970
42	369760	2918927	198543	626383
43	74583	46921	5070792	1002041
44	404513	862632	519870	1629746
45	1129561	238303	1117713	372464
46	395943	327971	851726	245272
47	3831347	767758	1866666	1155041
48	159110	170616	37516	1646392
49	1543491	676877	17659	2186974
50	57318	6480112	3670616	673623
51	409624	2737216	2058412	156490
52	4262086	221620	69648	2535569
53	71578	697274	595928	866086
54	122730	712839	323190	1155839
55	168798	4049650	3004983	1407537
56	1913103	160931	118773	577633
57	2075301	1000697	148662	126370
58	983227	7844816	4228090	3523486
59	85035	1178882	450889	872695
60	230477	980470	267943	309014
61	1274309	94861	1836772	70704
62	1377712	4471084	98815	252874
63	4938618	588626	1431045	204577

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	1859284	1992290	740130	1573329
65	4205306	347876	469143	52792
66	619326	993866	544075	429640
67	145732	3630823	429337	188918
68	235230	873047	1018407	2362400
69	4840267	192656	482323	630727
70	739294	193345	136925	14629
71	126237	1358341	36825	302326
72	1032907	81273	3116418	1758501
73	5495023	2412100	1537989	952422
74	2201733	636673	1963924	1141897
75	1236963	1879182	238968	5050134
76	72803	2391473	2363696	1002360
77	73904	470225	180588	156146
78	211961	477526	210905	2625115
79	978148	1909474	86039	246968
80	275359	412509	31582	1008555
81	716112	1290510	2513347	531830
82	134239	3934119	601122	145976
83	642611	293243	3428035	3603367
84	473676	79992	866159	2003622
85	3454384	235514	560257	277611
86	530087	166009	1129020	958536
87	175880	4020463	3313660	3656301
88	3847931	1314297	55540	278131
89	982348	412629	5001505	271512
90	131851	4847856	318508	401928
91	2567747	2530929	2130922	2688394
92	2480706	58705	44114	1216103

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	38370	2534362	600094	701126
94	1304195	4996931	57481	3726679
95	241816	2381236	1184271	1301540
96	8611999	7133976	649603	1865492
97	527952	2949218	1887057	961391
98	797026	1659284	100832	3361688
99	471771	603602	522598	1160552
100	59813	6242477	282900	615739

Table N.4: 100 runs with 10% media nodes: 5 minority - 5 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	4618376	2584978	108200	569066
2	479653	3063866	28605	281551
3	228397	55377	887983	122372
4	32175	360642	81189	603753
5	175829	14965	11994	27885
6	1887751	124003	328576	422825
7	1781692	241388	810197	114564
8	2588869	511313	1361904	190314
9	101091	108718	1224856	274499
10	56778	137447	80899	868360
11	670812	1812555	718218	512716
12	615647	45291	2114247	5159017
13	1448782	119758	529964	113124
14	3294227	480116	6590167	662400

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	129665	82763	7907993	598984
16	682757	823693	84290	862494
17	3786437	115648	178623	659801
18	248408	190143	1415725	4547031
19	29782	114971	638559	4515106
20	97103	767346	433777	75376
21	1324849	415061	48049	334479
22	445071	766113	4353498	77116
23	1576078	228273	1171854	173090
24	1765619	171683	1120495	5537582
25	1376471	3864269	287459	575149
26	256897	158527	45219	4461793
27	1582134	229326	349333	1494607
28	4452068	103816	2158612	31154
29	230904	1210702	7083299	937011
30	2809342	145549	2702047	1522046
31	1295945	149194	113894	38489
32	5393119	350554	121951	1491186
33	1524203	2646187	2175361	233999
34	1435048	27488	390225	3072649
35	1578354	1487492	1168694	197317
36	2931420	1914797	2913180	21695
37	792878	1937514	132974	553359
38	87224	223619	140016	40870
39	140774	119544	143776	208994
40	729353	42722	343264	2428784
41	95863	72054	6968339	600148
42	622849	104752	1752511	943266
43	13987	1388063	790096	906492

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	301013	4459072	28654	66841
45	111478	222086	914603	957193
46	293874	28629	4763876	1507813
47	1043319	1137340	402710	4273133
48	1051754	1901301	435033	3410874
49	123405	552070	3379666	1041893
50	168529	1367828	1222571	256538
51	175060	146571	2624838	17284
52	252101	847780	317156	625862
53	29483	1368660	160585	3624299
54	5134567	488160	801419	412367
55	3592155	1112965	1060001	38906
56	1823041	1018423	255712	66826
57	3383276	262799	1123918	25595
58	152888	430139	438345	757735
59	204982	283964	24615	6858699
60	493819	69673	1180296	6215528
61	425978	391710	190546	97222
62	581514	615180	241658	168547
63	1514246	308811	1550474	520008
64	468257	148649	2924249	819167
65	283082	696327	3924140	316664
66	337234	280313	433562	503037
67	382556	3087847	189012	166975
68	187541	346069	62122	184159
69	52904	530677	251068	2360729
70	164011	2505703	838534	3339290
71	2331391	247837	23583	413693
72	184821	129886	151301	468194

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	202565	396215	184742	1918627
74	139915	148210	71996	119520
75	634787	260232	100554	189703
76	132776	4624196	280139	3016682
77	610986	941869	933100	4142408
78	923643	2006992	470971	362182
79	3887500	57040	3155440	14930
80	375090	2682484	2744290	444053
81	921904	317127	662732	1451219
82	49166	504064	3977658	130368
83	19686	236260	757314	1381448
84	2905795	467016	345249	4190790
85	1383705	109460	1052593	2005953
86	1831152	504668	484896	2333359
87	32143	4160508	856114	116995
88	178549	668481	63016	61984
89	791403	42203	3751872	106407
90	416152	237251	1455631	418606
91	506084	1461017	1106855	5028316
92	583125	31518	5145834	114207
93	73366	389208	422797	1036596
94	90855	229523	889054	1954274
95	5834812	2029748	1723576	1969231
96	1067168	230126	4790455	515059
97	449389	117621	1787926	337743
98	2140616	226957	97912	1816971
99	1696397	178898	111763	1604912
100	2624850	1958805	422080	125878

Table N.5: 100 runs with 10% media nodes: 5 minority -  
5 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	908304	78017	245001	171816
2	432794	105759	321312	699709
3	611919	119616	523842	3371
4	4301830	121004	106959	553818
5	90963	1865409	243464	743130
6	670887	5520337	809482	178094
7	1145211	27791	135534	831641
8	5352480	46892	263210	150162
9	363105	205030	212512	85743
10	223476	550107	146004	41443
11	200965	2205278	785572	37521
12	858097	109291	31536	1658689
13	96143	2102793	96024	111237
14	175293	1476296	752972	404748
15	358531	286782	420483	173477
16	181622	377841	52506	958961
17	313864	116498	17437	184611
18	1227562	353770	541610	28120
19	1635663	2093217	4830296	164950
20	5144517	431062	3440892	53556
21	4322251	234352	79774	100297
22	1069837	1811792	303775	143099
23	459934	1061927	359766	877233
24	62099	242833	724359	1589225
25	265744	294100	169316	431408

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	241887	3614	932445	15964
27	3290422	1237249	522463	105677
28	133857	206825	1602085	30578
29	5598616	115601	5465683	331749
30	2181136	173957	111113	1022158
31	770528	98862	72187	230964
32	1548527	1456310	2344408	281593
33	42582	4544193	206953	174978
34	59150	11938	449670	328479
35	259985	205406	45794	2355747
36	472342	1039762	2363407	58646
37	2292902	207827	30942	145629
38	3758649	3325124	36801	1191097
39	175915	159100	130999	319176
40	3307007	124292	319869	670602
41	6014345	813087	1150943	504557
42	447390	126926	41753	4026733
43	1942694	1236055	119829	83791
44	737757	957274	56748	2700393
45	152391	194075	2621569	3322
46	37629	35519	30960	26671
47	371641	4803499	4383974	3763845
48	412148	260054	174954	1126336
49	327985	39796	92176	13471
50	376245	116861	261130	1303800
51	93500	171138	4278133	704457
52	802698	606724	120706	259735
53	620603	83321	103960	391901
54	874097	323712	61795	279852

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	115966	673338	162308	229896
56	456201	887875	1637154	603625
57	155339	46148	282114	10783
58	4072240	76781	215180	30455
59	178598	233359	108040	702156
60	140856	6784546	177448	2505420
61	40922	210110	94777	2593347
62	486536	912275	2267295	375237
63	154638	122011	122407	299489
64	46199	69744	9845419	1513727
65	191604	447594	2490006	879921
66	3538525	110578	330671	180486
67	3549944	282236	576952	35267
68	337612	89178	303400	1726199
69	54519	118776	4797660	86931
70	897100	560306	1759973	114061
71	5151968	1097796	305677	376922
72	3157417	3352943	436797	1396926
73	3656040	1963404	52715	148726
74	169431	46293	51011	297675
75	126750	4335419	645277	207599
76	108318	57753	903200	108328
77	1238332	407747	23250	3062128
78	4983782	820697	10794934	80401
79	1594578	52182	2286606	34003
80	2232389	79604	35311	81117
81	1064937	261505	74297	120352
82	1695324	91244	524825	657543
83	306352	1170042	47148	379750

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	29723	339635	2320581	301104
85	192843	1553972	244265	224053
86	209286	2214412	1399255	26269
87	207627	141324	709314	48446
88	269620	131761	1160411	15650
89	3001716	1653547	645793	70098
90	203572	2029790	207130	1523169
91	473923	83970	3754837	205976
92	119083	191486	252795	163830
93	2710712	1270144	87152	1325312
94	275194	956592	185357	560227
95	5349773	59726	2885412	145607
96	1091177	2897752	287690	100196
97	476815	1056149	130747	1482569
98	1440055	205994	783750	728580
99	2385064	2016386	431693	101130
100	1314719	172116	62971	4054078

## Appendix O

### Tables for 30% Minority Media Nodes: 3 minority media - 7 majority media (100 runs)

Table O.1: 100 runs with 10% media nodes: 3 minority - 7 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	837	169113	10856	6416
2	24390	225380	30344	120787
3	8672	12656	51933	14820
4	3672	29168	253094	282812
5	328	12986	5800	13525
6	271	5274	40871	36855
7	62851	2021	24291	32506
8	3005	265742	5005	135725
9	137045	60751	36715	3759
10	4749	22908	3388	849819
11	506182	69715	10264	13023
12	17280	382558	43560	82044
13	1881	44758	177763	5223
14	148730	1644933	174607	78698
15	481	884414	1413775	1042704
16	465	792	280202	1875802

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)290

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	11939	11693	3423	455812
18	266160	1998	176064	1230161
19	547	114436	1347899	1669291
20	3118	3105	306975	7040
21	163	725509	52704	19486
22	16463	3174	185660	38864
23	20034	17205	552378	254107
24	6764	5399	12883	7143
25	6216	3168	27863	54867
26	382207	31471	86168	1958175
27	2346	3204959	24261	3430160
28	18009	43795	22512	1592335
29	3097931	2363	18488	2348794
30	1995	23932	65216	24151
31	615	1581	13694	288480
32	1952284	669652	5652	6058
33	16525	64106	120557	3778054
34	1159	158459	1382926	92060
35	14741	1420875	15611	47278
36	726788	25372	61246	99055
37	4465	1795863	96611	2160493
38	20596	855828	14675	9292
39	30077	298	833208	45056
40	4385	4239	157444	305517
41	154743	4171	6407	110814
42	5101	167640	7062	12914
43	4203886	8550	10509979	2204275
44	599874	272355	20169	15909
45	236	111039	190562	34015

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)291

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	278238	55410	3086607	285125
47	4509	34705	18015	51046
48	32427	296756	108600	1406473
49	610	380075	25164	8302
50	548	21167	1305	29490
51	154533	282754	660133	1740483
52	177	4373383	2631577	60631
53	13695	1808	8726441	25854
54	1205330	19541	721464	2211934
55	308	6856	91884	148069
56	2706603	780138	654008	47410
57	215	129833	5088077	154384
58	70036	198673	136268	48276
59	3756	25046	26883	529189
60	209299	2824	2667924	253485
61	643	28372	551438	555325
62	59171	277099	28025	164654
63	10191	23568	5192989	42138
64	17427	567258	1754547	13447
65	1907	172528	2872	21908
66	3518	884098	123495	516998
67	1169	1340129	240962	57208
68	112954	100377	13257312	208819
69	606	2521	2681294	16378
70	276	2343	1118	1972558
71	960	36787	69803	738107
72	1519	355324	53303	5283829
73	1021	35283	15164	29976
74	13728	19246	583165	27428

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	81670	1197361	29189	31962
76	1431	934227	40836	139254
77	785	187780	83322	571730
78	1146484	6351	61879	1299533
79	4447601	10841	142254	191565
80	133241	3793	19251	168919
81	22061	1476	332893	71602
82	45217	449303	82686	993372
83	1361679	157297	23947	534501
84	1360	163665	811397	2831522
85	2050	6323	3647676	1505781
86	53922	9075	512112	3873665
87	1346	177525	37130	32176
88	926654	1374	37680	300255
89	919	160629	34875	984939
90	95	4776	58805	449841
91	205632	1968	77078	79340
92	163922	755	491789	51864
93	31258	521559	201847	104498
94	765	464660	48564	172306
95	155	24330	864793	197931
96	557	522863	351754	4454
97	1983	290308	650048	11873
98	85634	25113	733607	1298264
99	18044	14645	20742	15827
100	8379	278425	4186	79257

Table O.2: 100 runs with 10% media nodes: 3 minority -  
7 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	213	142303	97317	7286
2	593	6473	583	3937
3	2479	8129	569116	120933
4	503	21055	61165	4699
5	76	10485	39112	87959
6	39757	8266	54409	7357
7	948	71917	42206	132980
8	28480	830	145476	45172
9	295	1003567	2073	8657
10	18717	12295	2722	4930
11	669520	23484	13778	29504
12	1472918	17724	453521	21161
13	3911	4326	17781	162565
14	5262	2444	1465656	135187
15	9097	126841	457482	2919667
16	282	5128	15410	2259046
17	1157	23435	121547	33715
18	1046	9176	140025	51659
19	558	2417	266877	148767
20	1952	25417	20414	3010
21	2916	93594	1953	42779
22	62061	1079	87117	13378
23	24469	2505	10199	287395
24	5218	12416	215522	15270
25	806297	36097	520529	186686

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	29228	61203	14470	1712
27	289	194327	15378	10242
28	3731	140413	6481	451935
29	941	2526954	69218	483712
30	20031	38228	180912	17403
31	1027	11177	277404	3051327
32	672	5089	36302	56215
33	259124	1514	148844	50479
34	2178563	14204	256800	105288
35	1029	226459	5076	8352
36	403601	14162	5972	21007
37	6818	1016857	2207	43675
38	714	131854	4279	43207
39	375	2349747	53115	232766
40	761	19438	46125	32115
41	1314	1731	2454996	7972
42	3100	437	194997	504993
43	702	384359	236927	641592
44	235697	2840	14501	16375
45	382	384359	1663558	62249
46	348	1950	16425	9137
47	356	9800	7546	1455091
48	1594	317745	83316	2692945
49	654699	1433	24207	236119
50	2971411	22464	22340	360622
51	2780	34881	41340	15376
52	3622	1722	6053	104885
53	91119	28712	6135	32027
54	954	31586	109506	38324

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)295

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	765	23350	2644	2876
56	5153	50555	296873	158017
57	76983	49122	10072	18803
58	1335	9661	58889	2949100
59	171	1086	12375	62933
60	574	9230	1264333	15361
61	135546	10189	4099	145617
62	970	2112	736044	94696
63	1958	4856	663	468889
64	5906	2619	21801	307475
65	9255	62063	110030	138521
66	5088	2616	472297	6323
67	533	2585	51360	26918
68	7571	139775	943049	26919
69	4681	7114	4452	33438
70	11290	14359	1622811	9135
71	1315	17134	685	2793
72	5103	540018	870	261433
73	593	2241	17191	192671
74	5096	548207	24456	875031
75	426738	83685	10598	129353
76	1181	2286065	241509	32264
77	11719	302375	44913	2479
78	579250	20855	658523	178855
79	316	6123	38438	1317080
80	11942	1099	34030	190003
81	9104	30048	77548	182783
82	54411	2705352	17524	31069
83	1250	1889	484123	18146

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	8732	1374	238931	66560
85	2548	632	943649	39094
86	2242	2321	8551	849805
87	657	10515	8689	207496
88	326	1117557	11709	4934717
89	2308	395366	4676	5952
90	2442	3041	6059	177860
91	466	175062	6916	11547
92	4767	13939	166162	16182
93	258	2158	14220	41428
94	120386	15305	213283	62731
95	1104	33948	30622	39224
96	1762	12914	10558	593201
97	22074	1361	30635	1118241
98	19149	107660	3892	78450
99	32987	56010	22678	13652
100	94173	49644	3689	4330

Table O.3: 100 runs with 10% media nodes: 3 minority - 7 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	2920	1292	72013	53776
2	2517	2914	2913	49043
3	1485	105473	177460	15761
4	6732	4350	148547	68919
5	879	4967	22612	61603

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	2939	2518	48788	360553
7	81	2258	228794	56071
8	1933	2397	36719	12765
9	65362	44693	2548	493252
10	238132	39993	81988	5801
11	323	563	46226	6767
12	29725	63930	286518	2086164
13	763	11389	13818	25388
14	488	399019	2207	3380
15	434	28764	4284	15406
16	502	2170245	1422895	62749
17	4802	417701	35928	14334
18	12242	3340	5039	6062
19	1072	1538	15081	21639
20	1098	141165	899210	85248
21	339	1275	33590	35199
22	83210	5457	3703	48061
23	12335	491	3711	9441
24	127341	7601	421835	29056
25	147327	449	34590	261461
26	792656	7196	5158	39211
27	2444	1788	29836	284788
28	372	231066	1223	19258
29	1106	20374	1851	2988
30	4108	2632	21704	5725
31	3849	5585	363558	11001
32	69071	5217	1411633	30482
33	1217	222505	226213	2140445
34	686	701321	194465	1689647

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	1469	11269	157268	47972
36	3679	1415	13731	57540
37	1036	464226	18649	251929
38	430	35373	8309	17446
39	57613	26496	496678	3462
40	1798	12749	55563	8878
41	1230	992	28909	148686
42	1040	2878967	10836	59603
43	202	10785	11513	410582
44	175924	247151	37256	41665
45	200735	2350	11789	2536
46	4409	6527	454056	273528
47	712	41354	3238	4272
48	35671	25839	136836	73721
49	317719	943	4937	66067
50	2023	3614	6812	9244
51	8066	110707	6355	5970
52	375905	655821	98650	28745
53	1774	7649	126295	38337
54	2163	46296	35516	28861
55	352	2154	5076	7596
56	1351	7113	6360	26682
57	403	1294	6177	51610
58	3080	738	340985	27311
59	162	111647	13757	24582
60	1686	42828	7610	43214
61	158	9706	29716	7671
62	624	1616	1664	4517
63	6888	1223	78492	195667

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	467673	54808	129459	2310
65	463260	25208	1937	119105
66	548	9504	1162	7251
67	2824	9505	48421	45800
68	128497	200841	3955	5888
69	35321	5460	2990	37472
70	1020	2801	2272	1545
71	629	30841	149978	24339
72	5090	60941	63563	14825
73	546020	53137	7133	29612
74	5170	735	25680	42349
75	683	1625	170804	48639
76	11006	53805	97686	7994
77	527	382483	7771	4135
78	22962	141768	22594	66708
79	2130	3035	4732	154849
80	430690	72563	58244	368631
81	5298	1537	274703	11726
82	19744	2491	36906	27246
83	1231	22857	4377	382757
84	301	65948	8335	35452
85	1097	4196	1778	54819
86	266	15146	2216	11371
87	59526	196147	101167	995451
88	964	3605	19974	3129
89	1593	1086	6611	2480283
90	3058	768	6741	1771999
91	2153896	2792	103099	15313
92	7487	2263	25638	286574

Appendix O. Tables for 30% Minority Media Nodes: 3 minority media - 7 majority media (100 runs) 300

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	3949	7216	1164	12975
94	6319	735	51059	31545
95	2094	7438	1792	1318
96	10808	956479	7909	1313336
97	583436	10203	1145	4642
98	8064	15496	17236	1528
99	29725	20286	595977	10568
100	11935	1110	528820	4539

Table O.4: 100 runs with 10% media nodes: 3 minority - 7 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	414	13158	94006	22325
2	8039	988	10598	25365
3	3005	5283	88753	38987
4	137889	12786	9375	14182
5	2296	51715	2611	13233
6	73409	3851	55203	60177
7	291	2945	1168603	21262
8	39206	1325	181037	8884
9	712	699	3598	14273
10	5679	19050	5559	53432
11	1983	32014	47140	637285
12	798	2240	1777	5248
13	8072	20347	7825	3040
14	451	2700	1038	7887

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)301

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	278	18848	6470	7731
16	242	9182	7629	2213
17	394	1684	4914	167105
18	689	27992	118756	32225
19	925	3956	16593	11907
20	355	29809	88353	25810
21	4796	447	32308	2124
22	85426	1144	7212	24584
23	1655	68581	125754	24294
24	3333	33124	81669	11347
25	344	16701	123343	773060
26	9676	99263	29700	6557
27	302	2032	4123	220607
28	477	13100	28156	8818
29	1224	15408	118159	5883
30	1277	15661	9353	1257
31	983	14262	65845	30895
32	742	2383	2948	113140
33	975	2477	3254	7883
34	527	7407	63529	65035
35	305	9105	782	10996
36	791	44812	1726	9649
37	225	5474	2045	58291
38	138	70894	57414	1668713
39	183	4117	3121	2116
40	419	1991	11302	13141
41	8574	11374	6920	8699
42	15440	11308	732	22160
43	75383	146868	8736	50141

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)302

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	143	4178	433544	28616
45	432	105028	317143	8758
46	50582	1350	2281565	396324
47	11015	40560	83000	339046
48	68707	10623	2489	4842
49	19957	22093	27173	3492
50	316	3270	17260	18070
51	515	1304	38659	284348
52	7122	6757	767	6445
53	4237	5003	21118	2930
54	2153	3225	60416	35076
55	49206	639	1898	14223
56	16165	852020	1704	1191
57	789	13867	2271	15522
58	74686	288	8994	15519
59	1907	12713	2592	55550
60	1791	31667	8495	7544
61	956	3950	31789	18647
62	980	361486	5743	2733797
63	48466	2246	57512	23764
64	2275	1784	33257	1980136
65	7983	33550	739	1968143
66	37975	25820	242898	66987
67	942	658	18239	43957
68	840	1040	30417	87403
69	457	2005	4745	70694
70	380	3685	36322	8039
71	638	765	144291	18981
72	492	6584	5408	8002

*Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)303*

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	1925	1634	1924	15728
74	1009	4222	15330	10463
75	2090	2120	35200	119247
76	6274	1878 6	5821	3959
77	767	2295	13678	78005
78	86298	945	1551	9670
79	65396	770	75156	83241
80	2732	16775	2488	4117
81	1265	54019	5309	62165
82	272	713	2739	20414
83	555	81193	33046	103064
84	310	3163	31005	27855
85	2284	6660	874	4160
86	15947	641	1244	39540
87	231	29912	4743	8353
88	825	1217	1297	740
89	829	5359	469430	999859
90	719	15076	4753	8419
91	742	50121	18529	1801
92	585	4819	6000	9999
93	879	40644	11047	3220
94	50007	72944	3763	12760
95	1100	2069	1265	55514
96	4993	2942	86303	5101
97	342	793	15447	3400
98	393	2954	3707	1941
99	4466	549	65454	8535
100	669	2681	77521	14828

Table O.5: 100 runs with 10% media nodes: 3 minority -  
7 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	2724	244547	10137	3916
2	1213	6769	4574	7706
3	13640	4228	21190	17342
4	455	15181	6655	88411
5	6127	1189	1409	6349
6	614	1293	8192	257624
7	30285	648	13855	58609
8	10150	436	17972	21545
9	2606	2269	4872	15499
10	245	7218	975506	1612
11	461	3155	2786	2039
12	345	6179	4881	3885
13	2152	1975	2135	2353
14	2172	1975	3724	4741
15	816	8093	79363	6088
16	7254	726	1471	36488
17	15602	4201	5395	4041
18	858	1058	37262	26682
19	1427	6615	68170	2112
20	964	30871	1846	44008
21	71446	3181	1282	105492
22	860	6998	383157	8052
23	1086	992	1369	143664
24	678	885	29888	11346
25	1146	59870	18211	6527

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)305

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	1593	4602	70909	40712
27	506	786	4981	7058
28	53036	1809	213210	2382
29	2428	7700	1766	10553
30	192689	1050	4842	289081
31	12440	1433	691	710051
32	1409	8181	38851	14339
33	1539	6591	11197	27134
34	4666	791	40563	4298
35	428	2254	14484	99691
36	1789	2626	55413	6027
37	1266	3330	27735	36353
38	76856	11830	34006	48161
39	325	2998	3068	30245
40	597	4322	6264	17566
41	553	12362	64943	6768
42	1088	32664	9399	75534
43	138	5881	34005	4862
44	5433	17230	67797	39123
45	599	703	4359	198013
46	277575	4334	4501	423022
47	1129	1863	5579	42361
48	77952	870	837	5378
49	451	74474	2848	20509
50	10016	3605	9083	24826
51	58270	1858	7451	20579
52	364	3279	25262	8481
53	842	833	7919	7594
54	1169	6061	2680	65420

Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)306

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	198593	337649	205420	9654
56	7179	112857	89294	57089
57	20013	2304	1769	9078
58	717	24359	22503	8391
59	5070	96041	138120	66320
60	2542	1124	11829	12654
61	297	1216709	40889	29510
62	6423	2838	6908	7166
63	357	914	13439	55437
64	376	3908	8357	53225
65	649	350058	10794	2536
66	28659	2721	1941251	6543
67	4309	2817	6448	37715
68	192	545	1793	8035
69	9202	18366	1296519	31717
70	1326	1068	13366	33437
71	10758	1288	1580	167664
72	5607	2636	10331	115893
73	12428	8066	4122	4132
74	25768	1828	2318	67289
75	49744	1595	32887	57437
76	1920	58736	3267	13570
77	9676	3252	4510	61869
78	287	1436	4036	4693
79	246	1575	33179	88535
80	35431	11804	4152	71425
81	239	9359	3769	9605
82	79943	1115	5351	6103
83	672	4917	7281	6034

*Appendix O. Tables for 30% Minority Media Nodes:3 minority media - 7 majority media(100 runs)307*

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	529	4302	29262	3634
85	812	2208	8819	262598
86	2060	5498	11758	11490
87	515191	5208	4732	76099
88	2422	10816	23395	14633
89	4429	2263	1414	41484
90	600	8534	80992	13356
91	794	50158	1803	4251
92	2579	3356	6197	146021
93	517	786	2659	2106
94	126441	2165	7099	15877
95	4448	1887	828	6920
96	7015	1182	2469	37970
97	549	2081	37280	4632
98	446	70026	11770	42841
99	16250	3123	26412	30141
100	426	1915	3851	5345

## Appendix P

### Tables for 10% Minority Media Nodes: 1 minority media - 9 majority media (100 runs)

Table P.1: 100 runs with 10% media nodes: 1 minority - 9 majority, AND = 6, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	416	7921	28312	20407
2	389	385	13337	5189
3	1321	1092	29101	22059
4	291	6184	2067	14814
5	342	3047	19545	4562
6	374	35643	4471	4986
7	426	33037	4260	4737
8	54483	576	6960	139710
9	350	2471	4471	24594
10	1915	5997	8119	4565
11	232	5967	2014	4255
12	233	135674	6853	6355
13	732	3401	2164	2954
14	1327	15516	7222	14390
15	7662	791	3576	4742
16	575	20614	54246	5012

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
17	740	220514	12724	4935
18	25733	7523	834	34451
19	1062	341	36951	14708
20	1894	5546	11631	39386
21	4149	17390	8735	10342
22	3005	4783	9036	7516
23	1350	2553	19204	4807
24	5405	2375	2750	4551
25	1291	12972	33785	6437
26	29808	1692	6698	10646
27	1053	12973	3578	4891
28	22452	34657	31675	9750
29	676	78549	31033	21057
30	28731	5066	166474	6427
31	351	2178	4710	4889
32	1541	8592	5779	126117
33	238	16242	5709	15445
34	899	1400	1697	1567
35	20240	2252	7048	23907
36	1877	1626	17592	10322
37	2844	2253	1263	8092
38	422	32852	1013	22805
39	12009	2238	10505	9561
40	522	2284	7885	14190
41	7754	4177	3740	5349
42	470	3554	139706	19107
43	1564	89092	8052	10839
44	6793	11346	4018	4954
45	555	1732	4622	33774

*Appendix P. Tables for 10% Minority Media Nodes: 1 minority media - 9 majority media (100 runs)* 310

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
46	8075	3127	24373	70405
47	1372	45629	12920	23513
48	869	2599	15942	59862
49	25212	45630	22342	26372
50	524	5398	121466	69264
51	1931	18789	1657	6887
52	947	17969	6138	4274
53	706	18790	5209	10199
54	1554	792	5508	6435
55	17845	5575	4397	7062
56	232	15181	23527	28261
57	2893	1079	2173	5895
58	746	3245	1098	6194
59	11258	3093	5011	2588
60	440	9602	54693	3370
61	6959	3094	25716	9778
62	2484	2750	121181	14420
63	446	12200	30440	36327
64	1493	1531	22056	5530
65	169	12201	19864	28128
66	34818	4602	14705	7640
67	4106	4685	20032	44321
68	3408	43136	9783	7738
69	168	25416	5023	7825
70	1054	6891	9162	2730
71	738	9338	5654	23280
72	505	1383	23601	21806
73	1405	12076	3377	22271
74	409	13428	6142	5157

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
75	2179	4811	31558	72311
76	2058	1585	17607	6897
77	4911	15186	18265	46024
78	23020	10044	1272	39321
79	6104	1145	27474	3057
80	4989	1363	1880	5000
81	482	8819	15144	6627
82	1796	3189	10968	18146
83	545	8820	11862	10127
84	4540	3190	36696	37199
85	287	38753	57155	16387
86	715	3191	16307	2277
87	180	18501	72655	17153
88	559	3192	77029	10749
89	346	2943	10497	6420
90	147	1166	4729	1213
91	405	257123	20467	1766
92	205	2158	9825	14628
93	1925	11160	17521	26815
94	172	1511	5736	11255
95	343	11161	4478	5836
96	1550	25510	6462	11915
97	989	1075	15751	6689
98	5205	25093	2141	108569
99	9693	2503	2371	11602
100	7748	5089	22817	25804

Table P.2: 100 runs with 10% media nodes: 1 minority -  
9 majority, AND = 7, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	565	3306	2634	1552
2	338	2963	6891	3290
3	321	777	4619	23192
4	1677	3319	1639	4991
5	823	2330	6685	8562
6	351	1306	12439	44881
7	276	1260	1865	29714
8	306	3705	69807	3541
9	508	1981	4589	5850
10	669	3055	3459	8951
11	384	5956	7108	20286
12	298	5538	1546	35564
13	891	7823	6337	1816
14	682	7633	12580	5227
15	1481	10738	8020	1272
16	788	1287	3267	35885
17	402	2393	7784	7348
18	1169	3516	5936	1448
19	393	966	4880	3568
20	1010	646	4121	8845
21	607	2733	18944	9370
22	310	4137	9372	4138
23	1276	6899	7534	1575
24	97300	3371	3087	4236
25	672	16207	6159	4530

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	1134	16755	80314	146045
27	1093	995	1039	2889
28	1149	2372	4652	36712
29	643	2275	8131	11675
30	632	19092	3231	2138
31	590	751	2324	10536
32	2764	2071	9767	5856
33	529	878	15772	4354
34	996	7979	7654	106356
35	451	21933	1724	3857
36	1343	17205	8917	25393
37	27982	31906	3082	1668
38	667	1190	7674	30267
39	563	1241	3368	2691
40	336	52537	70348	12395
41	2778	773	635	11975
42	2104	2438	51555	4308
43	229	2522	9739	2010
44	170	1387	2479	6533
45	4422	7004	17268	3013
46	12045	3390	20884	33439
47	718	1323	7313	69083
48	375	6199	8712	32443
49	541	812	4486	6056
50	851	3832	2336	2625
51	856	2201	1287	4852
52	1125	927	87974	22588
53	627	2301	3408	13138
54	1428	1720	3861	27730

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	10718	1179	7247	13741
56	634	768	16210	17187
57	1387	579	7291	3757
58	995	779	4046	2956
59	783	361	4844	25991
60	2224	1175	18228	3396
61	820	1218	1406	1759
62	1135	11409	1855	4697
63	1668	398	3113	2067
64	458	3599	6721	4718
65	4072	4770	2332	4789
66	1643	868	4194	3350
67	13517	88188	11210	8006
68	921	1452	17069	7586
69	590	841	3540	90544
70	406	950	11391	3156
71	3750	2387	1143	12454
72	360	2413	1824	19880
73	411	1530	3746	3726
74	258	4156	146963	4977
75	496	82883	1297	3309
76	783	994	11192	6329
77	239	8471	30186	7006
78	4399	7868	8869	2439
79	864	836	4491	58968
80	889	586	1891	7337
81	2190	2232	10807	3576
82	324	4587	4040	28878
83	817	691	8020	5882

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	567	1552	1576	9200
85	197	15533	1407	23584
86	2481	2866	2484	27417
87	205	1686	7348	3220
88	1114	831	10561	36845
89	1210	486	1749	10065
90	270	1605	2925	105502
91	4356	4671	7340	6486
92	573	17382	1161	36990
93	993	4159	1194	16896
94	138	1482	22460	36134
95	4450	1868	18172	2002
96	52699	2107	16495	9369
97	526	1144	1930	15259
98	359	6079	2086	3293
99	477	5347	13015	2389
100	375	3083	7201	14384

Table P.3: 100 runs with 10% media nodes: 1 minority - 9 majority, AND = 8, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	810	1639	3860	3592
2	1522	1289	1974	6505
3	648	39571	967	3535
4	1119	657	5989	13457
5	1246	4207	17728	10071

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
6	1941	2412	9822	3582
7	5398	4231	1001	2101
8	802	1017	5159	1536
9	4429	5401	1251	4056
10	384	1295	1139	5428
11	3544	631	15607	1655
12	849	1371	29109	4512
13	280	68837	1521	7569
14	1203	1653	1435	2620
15	2183	1541	6066	13337
16	401	16975	858	2821
17	2472	761	21554	9712
18	488	2279	9423	1864
19	1407	4816	51430	6507
20	371	2593	1697	14308
21	1227	3123	7132	1769
22	316	1034	1537	14993
23	4726	3304	20267	1593
24	150	972	1976	40577
25	5270	1235	3184	6365
26	5706	2131	4128	2249
27	169	1999	1936	18345
28	583	1572	5687	3787
29	182	1238	1728	3932
30	441	1706	2108	2778
31	2956	10860	1343	7958
32	511	4886	2149	7652
33	2213	663	3669	2271
34	1056	4969	3708	46152

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
35	217	1103	3019	1741
36	1130	1168	2351	3832
37	1554	10489	737	27461
38	1037	5022	833	16205
39	681	370	1169	781
40	851	2011	18880	3027
41	901	21964	4218	12787
42	1095	671	1953	3751
43	1090	1496	3109	9396
44	683	1000	4732	18455
45	8093	11543	1870	4812
46	510	1680	1023	15664
47	392	653	5215	3165
48	414	2077	7009	18857
49	301	2851	3342	7478
50	1700	717	729	6482
51	339	11740	29599	19918
52	6377	7851	799	1841
53	683	5126	6434	10846
54	35837	2277	1674	4521
55	2290	9575	1345	6845
56	9716	1487	1268	11208
57	747	2038	1956	1359
58	4229	6671	1682	7381
59	391	5523	25901	7078
60	1547	4688	9651	1897
61	265	1197	16323	11192
62	999	1037	1745	2340
63	346	2270	1199	2453

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
64	286	1055	3184	5263
65	1467	820	2417	5558
66	316	3393	9163	613
67	647	7572	1500	4375
68	932	1613	1359	7321
69	460	1643	4552	1404
70	2842	7238	6171	5108
71	898	690	2098	41845
72	460	593	6985	50560
73	460	464	21025	28655
74	175	2261	16251	7495
75	463	8040	2751	2097
76	260	348	4857	3981
77	652	1008	14641	9792
78	555	19509	11502	14096
79	693	4050	2416	1805
80	536	1293	16013	1887
81	719	638	8073	4605
82	770	499	1614	2432
83	851	497	4952	3211
84	508	6760	573	10434
85	1584	612	1497	10376
86	961	1389	3559	53038
87	743	8876	1849	16674
88	295	2442	48053	5372
89	552	2830	6679	5784
90	196	2964	5005	3131
91	606	4429	5818	9603
92	285	1305	3933	131506

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
93	1433	6955	7942	9643
94	1933	3130	2121	10245
95	4058	5219	5117	4374
96	6189	1503	9709	17003
97	414	848	2143	3043
98	1646	1195	5280	6028
99	203	1372	2632	3983
100	5380	994	1473	8219

Table P.4: 100 runs with 10% media nodes: 1 minority - 9 majority, AND = 9, varying proportions of non-media nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	3719	368	6038	19722
2	454	671	2048	9132
3	414	390	18237	6078
4	5325	807	1349	1411
5	1881	25888	1452	14174
6	408	1610	1550	4601
7	580	294	7948	28950
8	311	514	1652	33151
9	410	2192	4408	2386
10	514	1607	524	6142
11	743	1373	1797	7222
12	10277	12745	1339	4705
13	1840	836	1513	1069
14	461	775	2346	8147

*Appendix P. Tables for 10% Minority Media Nodes: 1 minority media - 9 majority media (100 runs)* 320

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
15	497	8252	784	12824
16	1878	843	2431	19273
17	373	695	2082	1590
18	1377399	469	129928	19494
19	154	407	11794	8526
20	5911	6980	905	2381
21	2350	1204	1646	1566
22	211	939	5502	1189
23	484	1787	1559	6307
24	604	861	14801	21834
25	483	1041	10048	7623
26	346	1440	20385	3794
27	401	4661	12468	10379
28	176	2217	798	133501
29	1059	4842	3376	11300
30	262	1129	1336	600
31	1649	391	3303	12843
32	367	4441	510	5862
33	514	404	3264	3555
34	458	52212	18000	9978
35	2729	557	3734	6529
36	582	2202	2221	51926
37	1027	2614	3039	4373
38	6141	47331	4678	3605
39	703	4881	9522	23077
40	1176	2680	1334	4584
41	4532	459	1456	2153
42	66329	1186	27002	1877
43	469	1879	8674	12082

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
44	199	1832	32130	11112
45	470	381	1847	16978
46	247	2715	1915	2427
47	231	2165	23536	9151
48	765	2042	822	2426
49	710	1916	619	2737
50	247	2085	4588	3549
51	449	721	2317	1774
52	347	643	5264	3838
53	890	447	1063	2848
54	1129	4422	10871	2545
55	415	1716	66848	9190
56	699	1938	4893	5424
57	3988	2201	809	3713
58	328	1782	9004	27971
59	282	433	2124	2610
60	379	2194	2849	6104
61	621	493	2419	36704
62	1259	1773	8075	3710
63	562	1057	2279	1744
64	976	1908	1257	2890
65	331	884	17789	11503
66	198	355	1844	1886
67	617	1837	1926	11565
68	2111	3332	910	6792
69	3731	1377	3970	5152
70	452	11231	1408	15285
71	1364	959	4897	895
72	164	2430	1994	20379

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
73	3760	361	3790	11032
74	472	523	5197	60638
75	272	2376	2390	2004
76	609	647	1969	18823
77	238	2704	10562	2679
78	258	645	5691	3956
79	180	872	1410	22920
80	371	731	11665	3310
81	807	7066	1378	8056
82	499	2520	1364	15797
83	438	2005	2758	3857
84	565	2770	3549	13945
85	9003	2483	1145	1588
86	1247	612	1422	4836
87	366	2787	8240	10324
88	4239	2015	3196	3922
89	401	1802	1396	7080
90	425	1851	9825	2567
91	3651	1064	1435	2926
92	7652	500	17037	5514
93	422	908	1133	6098
94	288	1465	17740	13660
95	455	1295	1851	1748
96	2085	460	4131	4691
97	1247	2046	1237	2522
98	1739	564	1553	3281
99	233	1573	10991	1999
100	177	934	1110	3068

Table P.5: 100 runs with 10% media nodes: 1 minority -  
9 majority, AND = 10, varying proportions of non-media  
nodes

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
1	305	909	35715	1675
2	751	4959	2557	4516
3	386	781	2611	3198
4	932	1041	1444	1359
5	616	970	2202	1211
6	780	9442	950	33397
7	868	2380	4600	2477
8	1099	1104	1579	9213
9	1429	762	3117	1299
10	389	2048	1446	4362
11	432	1460	1307	1426
12	1187	1924	1130	2324
13	361	994	6504	7296
14	1103	622	2427	1859
15	210	1624	5108	3776
16	265	1118	1228	19964
17	433	570	3899	2723
18	739	1736	2191	2877
19	205	650	2236	3340
20	559	1540	1212	4735
21	1036	11704	524	2511
22	512	760	2800	11618
23	2422	771	3107	4462
24	517	1900	2137	2785
25	1232	4072	3521	2792

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
26	500	778	791	5725
27	241	3841	2138	5364
28	1153	602	1356	13155
29	552	2277	1277	8477
30	721	2969	1551	32153
31	625	5904	1751	6585
32	261	601	1060	2501
33	535	722	2638	5001
34	576	905	3163	4444
35	711	940	7344	1423
36	197	2292	5761	1922
37	1418	719	4771	6078
38	282	776	9090	3923
39	447	2949	3578	2011
40	685	1274	2041	3078
41	294	1461	2989	16916
42	680	709	1662	1082
43	1406	553	752	4118
44	305	1675	6887	1339
45	168	3763	1853	5757
46	730	2674	2098	3808
47	449	2291	5564	2774
48	1096	943	1450	3165
49	272	1542	38195	6092
50	468	827	2225	11934
51	610	10776	1599	16488
52	15604	2657	6067	10423
53	854	518	9221	4568
54	843	53479	8418	24681

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
55	496	2381	2016	1666
56	2080	1581	7317	3309
57	574	1923	5148	9717
58	19586	744	4943	11881
59	352	1984	3657	4174
60	869	7810	4980	2360
61	1759	1729	1453	1833
62	1694	49692	68088	9532
63	449	631	3327	811
64	2138	1087	577	22559
65	1068	2644	1974	1879
66	484	654	2996	3327
67	227	728	2503	2457
68	5398	636	836	1631
69	699	772	8272	2706
70	619	1343	2003	884
71	3312	331	6421	9027
72	691	1706	7538	2803
73	1895	2178	54480	9829
74	1084	1066	2042	2248
75	1659	1629	1940	1945
76	1948	2117	1472	6258
77	1632	2171	2732	1057
78	2155	848	3488	1685
79	344	2886	4473	2176
80	387	5061	13534	4455
81	2208	8436	14333	3632
82	496	1080	2357	15171
83	412	2191	8052	1566

No. of Runs	10 minority 90 majority	20 minority 80 majority	30 minority 70 majority	40 minority 60 majority
84	2030	416	4084	7217
85	819	1262	6003	7791
86	19610	1381	1061	2288
87	391	569	3058	2254
88	1114	1244	2981	3351
89	217	1244	4036	4096
90	336	1476	3265	1766
91	2782	8686	1713	2292
92	465	1332	4626	12145
93	357	2321	1054	4439
94	281	3690	4410	1563
95	307	14310	5076	1967
96	573	1101	2045	1860
97	288	572	1021	2204
98	728	3019	3030	3329
99	703	397	1729	3579
100	816	1722	1107	10519

# Appendix Q

## Source Code (NetLogo)

```
turtles-own [
    opinion           ; a characteristic that contains the preferences of a node
    committed?        ; a characteristic that contains the "committed" status of a node
]

;;;;;;;;
;;;;
;; Setup ;;;; ; for the randomly generated network
;;;;
;;;;;;;

to setup
    clear-all
    setup-nodes
    ask n-of initial-minority turtles      ; convert some of the initially created majority nodes to
        [ become-minority ]                ; minority nodes
    setup-minority-media
    setup-majority-media
    setup-spatially-clustered-network
    ask links [ set color white ]
    reset-ticks
end

to setup-nodes
    set-default-shape turtles "circle"
    create-turtles N          ; create nodes for the network
    [
        setxy (random-xcor * 0.95) (random-ycor * 0.95)
        become-majority
            ;; randomly place the majority nodes on the map, but not too close
            ;; to the edge
    ]
end

to setup-minority-media
    create-turtles number-of-minority-media      ; create *n* minority media nodes
    [
        setxy (random-xcor * 0.95) (random-ycor * 0.95)
        become-minority-media
            ;; randomly place the minority media nodes on the map, but not too
```

```

        ;; close to the edge
    ]
end

to setup-majority-media
  create-turtles number-of-majority-media      ;; create *n* majority media nodes
  [
    setxy (random-xcor * 0.95) (random-ycor * 0.95)
    become-majority-media
      ;; randomly place the majority media nodes on the map, but not too
      ;; close to the edge
  ]
end

to setup-spatially-clustered-network
  let num-links (average-node-degree * N) / 2      ;; number of links that can be assigned to one
                                                 ;; node (based on Euclidean distance)

  while [count links < num-links ]
  [
    ask one-of turtles                         ;; randomly choose a node that will create a link
                                                ;; with another node
    [
      let choice (min-one-of (other turtles with [not link-neighbor? myself])
                               [distance myself])           ;; choose (a minimum of) one of the neighboring
                                                 ;; nodes that are not yet linked with the first node
      if choice != nobody [create-link-with choice] ;; after choosing, create link from first node
                                                 ;; to chosen neighboring node
    ]
  ]

  repeat 10                                     ;; spreads the network across the map so that there
                                                 ;; are no clumps of nodes
  [
    layout-spring turtles links 0.3 (world-width / (sqrt N)) 1
  ]
end

to become-minority                ;; settings of minority non-media nodes
  set opinion ["A"]
  set committed? false
  set color blue
end

to become-majority                ;; settings of majority non-media nodes
  set opinion ["B"]
  set committed? false
  set color red
end

```

```

end

to become-minority-media           ;; settings of minority media nodes
  set opinion ["A"]
  set committed? true
  set color green
  set size 2
end

to become-majority-media          ;; settings of majority media nodes
  set opinion ["B"]
  set committed? true
  set color orange
  set size 2
end

;;;;;;;;
;;;;; Go ;;;                      ;; code for the executions of the model
;;;;;;;;
;;;;;;;;
to go
  let min-A (count turtles with [opinion = ["A"] and committed? = false]) / 2
      ;; set preference (percentage) for the minority "A" opinion
  let maj-B (count turtles with [opinion = ["B"] and committed? = false]) / 2
      ;; set preference (percentage) for the majority "B" opinion

  ask one-of turtles [ interact ]   ;; after each interaction of two nodes
  if ticks mod plotting-interval = 0
    [ my-update-plots ]           ;; update the "Opinion Shares" graph
    tick                          ;; move on to the next interaction (increment number of ticks)
  if (count turtles with [opinion = ["B"] and committed? = false] = 0 or count turtles with
      [opinion = ["A"] and committed? = false] = 0) [stop]
      ;; checks whether the preference for either opinion becomes zero
      ;; if yes, then stop the simulation
      ;; otherwise, continue with the interactions
  end

  to color-agent                  ;; color traits for switching preferences after an interaction
                                ;; between two nodes
    if member? "A" opinion [ set color blue ]       ;; minority non-media node
    if member? "B" opinion [ set color red ]        ;; majority non-media node
  end

  to interact
    let listener one-of link-neighbors            ;; randomly select one of the linked neighboring
                                                ;; nodes to be the "listener"
    speak-to listener                            ;; the current "speaker" turtle "interacts" with

```

```

;; the chosen "listener" linked neighboring node

end

to speak-to [listener]
  let voice one-of opinion
  ;; "voice" takes the "opinion" ("A", "B",
  ;; or "A B") of a node

  if [committed?] of listener != true [
    ;; if "listener" node is not
    ;; "committed", continue;
    ;; otherwise, choose another "speaker" node
    ;; and repeat the interaction

    ifelse member? voice [opinion] of listener
      ;; if the "opinion" of "listener" node is
      ;; in "Voice"

    [ ask listener [
      set opinion filter [ ?1 -> ?1 = voice ] opinion
      ;; filter through the opinion list in
      ;; "voice", and whichever
      ;; is identical to the opinion of "listener"
      ;; node, set that to be the opinion of
      ;; "listener" node
      ;; ex. if "voice" has "A" "B", then it would
      ;; end up just having A)

      color-agent
      ;; set the appropriate colors for the
      ;; appointed "opinion"
    ]
    [ ask listener [
      ;; otherwise, if "opinion" of "listener"
      ;; is not in "voice",
      ;; then set "opinion" of
      ;; listener node to be as "A" "B" and repeat
      ;; "to interact" function
    ]
  ]
end

to my-update-plots
  ;; plotting graph beside the map that is
  ;; updated per time step/tick

  set-current-plot "Opinion Shares"
  set-plot-pen-interval plotting-interval
  set-current-plot-pen "Minor"
  plot (count turtles with [opinion = ["A"] and
    committed? = false ]) / (N + 2 - number-of-minority-media - number-of-majority-media)
  set-plot-pen-interval plotting-interval
  set-current-plot-pen "Major"
  plot (count turtles with [opinion = ["B"] and
    committed? = false ]) / (N + 2 - number-of-minority-media - number-of-majority-media)
end

```