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Network of a Lone-Actor:
Social Reinforcement of Extremist Behaviour

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Network of a Lone-Actor: Social Reinforcement of Extremist Behaviour

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Abstract

This thesis uses network-, and behaviour- analysis on the lone-actor terrorists Anders Behring Breivik three years before his terrorist attack on July 22nd, 2011. This thesis aims to look at structures of social reinforcement as one of the reasons for radicalisation. Early history is also included for a broader understanding of the potential stimuli that made up Breivik's learning history and reinforcement schedules. The structures of reinforcing contingencies in Breivik's network is understood as a complex system in which Breivik minimised entropy by halting information flow between other nodes to avoid detection from government officials. The study found that Breivik had a network with substantial amounts of structural holes and utilised the social capital of other nodes to his benefit in the planning, training, and execution of the terror attack on July 22nd, 2011. The relations he had, and the lack of others, mitigated and enforced radical or extremist views as understood in a complex system led to acts of terrorism, understood in this thesis as an emergent product. The contribution of this thesis is to use social network analysis and behaviour analysis in the framework of complexity theory to better understand the functions of the behaviour of marginalised individuals that commit violent acts of terror. However, more research on the topic is needed. This thesis emphasises the importance of consilience among different fields of science intending to understand violent acts of terrorism to better prevent them in the future.

Keywords: Behaviour Analysis, Social Network Analysis, Lone-actor, Terrorism, Social Reinforcement

Abstrakt

Denne tesen anvender nettverks- og atferds- analyse på ene-terroristen Anders Behring Breivik tre år før terrorhandlingene hans den 22. juli 2011. Tesen tar sikte på strukturene av sosial forsterkning som en av grunnene til radikalisering. Tidlig historie er også inkludert for en bredere forståelse av potensielle stimuli som utgjorde Breiviks læringshistorie og forsterkningsskjemaer. Strukturene av forsterkningskontingensene i Breiviks nettverk forstås her som et komplekst system hvor Breivik minimerte entropi ved å halte informasjonsflyten mellom andre noder for å unngå å bli avslørt av norske myndigheter. Studien fant at Breivik hadde et nettverk med et betydelig antall strukturelle hull og benyttet seg av den sosiale kapitalen av andre noder i nettverket for hans egen vinning i planlegging, trening, og utførelse av terrorhandlingene 22. juli 2011. Relasjonene han hadde, og manglet, begrenset og styrket radikal eller ekstreme synspunkter som i et kompleksitetspersektiv førte til terrorisme som et emergent produkt. Bidraget av denne tesen er å benytte sosial nettverksanalyse og atferdsanalyse i rammeverket av kompleksitetsteori for å bedre forstå funksjonene av atferden til marginaliserte individer som begår terrorhandlinger. Tesen vektlegger også viktigheten av consilience mellom ulike felt av vitenskap med intensjon om å forstå terrorhandlinger for å bedre forhindre dem i fremtiden.

Nøkkelord: Atferdsanalyse, Sosial nettverksanalyse, Ene-aktør, Terrorisme, Sosial forsterkning

Terrorism is one of the most feared permanent products of extreme political views today. In Norway, the acts of terrorism by far-right extremist Anders B. Breivik on July 22nd, 2011, also the acts of far-right extremist Philip Manshaus on August 10th, 2019, shocked a whole nation.

The Police security service (PST) in Norway has made a point in their threat assessment for 2020 and 2021 by recognising lone actor terrorism as one of the most severe threats against national safety (Politiets Sikkerhetstjeneste, 2020, 2021). Furthermore, the Norwegian government remarked that the threat of violent extremism has grown as the complexity of today's society also had increased, unlike in the 1990s before the internet was widespread in western civilisation (Regjeringen, 2019).

In the aftermath of terror actions, public instances like the Police, education-, and health-systems get criticism for not being able to predict the event (Gill, 2015), network analysis and behaviour analysis' understanding of complexity may be able to point these instances in a direction to better prevent future lone-actor terrorist actions.

Sidman (2003) writes that the behaviour analyst will focus on the three domains: experimental, theoretical, and applied study of behaviour analysis. This thesis will mostly take place in the theoretical and applied domain of behaviour analysis as this thesis draws on central theories and research to shed light on the radicalisation of Anders Behring Breivik before the July 22nd events 2011 in Norway. The concepts of reinforcement as defined in the behaviour analytical taxonomy will be utilised in this thesis to contribute to the explanation of radicalisation in individuals. Reinforcement is known as a consequence following an act that makes the action more likely in the future. However, it is only reinforcement when said reinforcer leads to more acts of the same class; as all behaviour is not always identical, it needs a parameter in which the behaviour can be defined. For example, a political radical could hold a public appeal and get cheered on by listeners, or on the other hand, write blogs on the internet and get reinforced by the attention and fine remarks

of like-minded individuals in the comfort of his/her own home. This type of reinforcement is called positive social reinforcement of behaviour, which this thesis will look into further.

Although there are possible ways of researching terrorism in the three domains explained by Sidman (2003), the amount of terrorism research in behaviour analysis is scarce, and in Norway, it is almost non-existent. The lack of behavioural analytical research could be explained by that other fields of science generally focus on this thematic, like criminology. However, a different approach angle might be beneficial not only to the field of behaviour analysis but also to society's good when trying to understand or predict terrorism.

The method of approach to this study of lone-actor terrorism, social network analysis, will be used to shed light on the networks that make up structures of social reinforcement structures. Hence, shaping an individual from the normative to the radical and extreme towards violent acts of terrorism.

Defining concepts

The taxonomy in behavioural analysis must be made clear to understand the thesis perspective. The concepts used in behaviour analysis often have familiar words; however, the meaning of the concepts between daily life and behavioural science may vary. The relevant terms are described in the chapter Literature Review, Behaviour Analysis.

The term lone wolf is used to describe terrorists who plan and execute terror by themselves. This term is not imprecise and is often used by scholars in the research field of extremism and terrorism. However, this thesis will avoid using the term for reasons associated with the romanticisation of violent extremist or terrorist actions. The definition could have been single-cell terrorist, but in this thesis the perpatrator will be defined as a *lone-actor terrorist*.

Another concept that must be made clear is the definition of radicalisation. Historically radicalisation can be defined as moving from a normative mindset and values to a radical position with a willingness to use

violence to achieve political or ideological goals. However, being radical can often be at the far left or right of a normative spectrum of values or ideologies. As Gule (2019) writes, the second part of the definition of willingness to use violence is not radical but extreme, and consequently, the new term extremisation is needed. Moving from a normative to a radical view is called radicalisation, and moving from a radical view into an extreme one is called extremisation. It is within the extreme views of ideology or politics that the willingness to use violence increases. Mobilisation as a concept can be defined as the intentions or acts of planning, discussing ideological views with the overall goal of deploying a terrorist attack. However, not all extremists move to mobilise violent terrorist action, some stay hidden on internet forums and discuss their views only.

From a complexity system perspective, several terms are used to describe the processes of a system. One of these terms is entropy, also known as chaos, representing the amount of activity in the system. As an opposite is equilibrium, a state where the system remains relatively stable, these two degrees of conditions, either chaos or equilibrium, exist figuratively speaking on the same axis. In this way, a complex system moves between entropy on one side and equilibrium on the other. Furthermore, a complex system can typically move between the two states in different system lifespan segments. Lastly, the term emergence describes the overall output of a complex system and is defined as ¨the whole is more than the sum of its parts¨ (Axelrod & Cohen, 2000). In this thesis, terrorist behaviour might be seen as emergent behaviour from the complex relations between agents/nodes in a social network.

Delimitation of scope

The thesis utilises literature based on behaviour analysis, social network analysis, and complexity science but mainly focuses on a Norwegian demographic. Anders Behring Breivik is the perpetrator in question in this thesis. The data connected to Philip Manshaus acts, however relevant, are not available through the National Archives at the time of writing and is therefore not being included. Although there

could have been other pertinent perpetrators for this thesis outside Norwegian borders, the nature of the data demands on-site reading in the National Archives. As other countries operate in the same fashion, and the fact that the global pandemic of Covid-19 is limiting the possibilities for travel, the demographic has been kept to Norway alone. Lastly, the shared scope of a master's thesis alone can only fathom so much, and it is therefore focusing on one lone-actor as opposed to two. The acts of Philip Manshaus are relevant but will have to be addressed by future research.

Research question

What role does social reinforcement have in radicalising an individual to commit terrorism?

Literature review

Social Network Analysis and Complexity

Social network analysis is a research method that aims to understand the interconnectivity of nodes, a node can be anything, but in social network analysis, it is expected to represent individuals rather than objects. Nodes have specific attributes or continuous characteristics like age, the gender you define yourself with, among others. These characteristics are used to describe and discriminate between several nodes. In social networks, nodes are connected through relational characteristics or ties, which also have attributes like being a co-worker, a family member, or a spouse.

Network analysis has three primary analysis levels that need to be kept separate: the dyad, node, and network level. At the dyad level is the study of pairwise relations; as an example relevant to this thesis, could be "does dyad-terrorists radicalise different than lone-actor terrorists?". The node-level concerns itself about aggregations of dyad-level measures, such as in "are lone-actor terrorists operating alone?" when the numbers of ties are counted (Borgatti et al., 2018, pp. 2-3). When a node interconnects other nodes or makes up a gap in the network structure, this can be defined as brokering. Brokering could also be linked to social capital, as the node connecting two different networks might enrich their resources and choose not to share

resources between networks or clusters (Borgatti et al., 2018). However, some scientists have misconceived the field as a method only. Although it is a method to view the rationale of social phenomena, network analysis is also embedded with theoretic concepts as centrality and structural equivalence, which is a part of the distinctive method of explaining social structures (Borgatti et al., 2018, p. 11).

Moreover, network analysis also communicates with other theoretical perspectives like social capital theory, amongst others. However, the contribution of this thesis will focus on the behaviour analytical perspective, as the primary goal will be to uncover social relations and how complex relations affect an individual. Therefore, one could say that social network analysis is related to complex systems science, as it is a way of mapping the social interactions of nodes within a complex network (Bento et al., 2021). The social network analytical levels discussed in this thesis will be the ego-level as in node level and Network-level.

Structural holes in networks are defined as a low degree of interconnectivity among the nodes of a network. Example: I node A has contact with node B and node C, but node B and C do not connect the network has a structural hole. As such the node A can be defined as ego, the centre node. Ego increases its social capital and can utilise information from both B and C to egos benefit without exposing ego's contact within a wider network.

A complex system is characterised by many components that interact with each other and form networks of interaction. As such, complexity theory is holistic as the system is more than the sum of its parts. These parts might be single objects or individuals and sub-systems of the total complex system, as in a system within the system. Systems within systems have to do with different levels of reduction, as in “which level or part is the scientist looking at?”. Therefore, system components are hard to study in isolation from the rest of the system, as the interaction between nodes makes it emergent (Domenico et al., 2019). However, emergent behaviour is hard to predict, and changes in the structure of a social relationship can produce

significant differences in an outcome. There is research on the spread of behaviour in networks and speaks of social reinforcement. Social reinforcement is not necessarily defined in this research as it is yet to be understood and relies on future research (Centola, 2018). This thesis will aim at defining social reinforcement and try to put the term in the context of spreading behaviour in social interactions, hereby radicalisation/extremisation towards violent terrorist acts.

Behaviour Analysis

Behaviour analysis (BA), as in radical behaviourism was introduced by Skinner (1938), which paved the way for the new paradigm of a scientific approach to studying behaviour, moving away from the exclusion of thoughts or inner processes called private behaviour. BA mainly focus on three levels of selection: phylogenesis – the selection of the species; ontogenesis – the selection of consequences in the individual; and cultural selection – selection among individuals in a group.

Skinner explained that the process of selection by consequences happens by reinforcement. Reinforcement occurs when a stimulus change is provided based on a specific response from the individual and increases the future frequency in a similar type of behaviour in similar conditions for that individual (Cooper et al., s. 14). The stimulus change may be positive or negative as a part of social reinforcement, which increases the possibility of similar future behaviour in the individual (Bento et al., 2020). In short, behavioural science is a scientific way of explaining the shaping of an individual by its learning history.

For example, parents shopping in a grocery store with their young son may come to face demands from the young and might even bribe their way out of an uncomfortable situation. Say, the son starts to cry after a while of asking politely for ice cream. If the crying and the unwanted attention in the store becomes too aversive, the parent may get the son ice cream. This is negative reinforcement for the parents as the noise, and unwanted attention goes away after giving ice cream. The reinforcer is silence and less unwanted attention. For their son, however, this situation is an example of positive reinforcement that is material. After

a while of crying or yelling, he gains the ice cream, and now he knows it probably will work in the future as well. The contingencies of operant and respondent intertwine here, as food is a primary reinforcer, a respondent, but the way to acquire the ice cream is operant. Although a basic example, it can be transferred to a context of extremism and terrorism. As individuals communicate, listening behaviour in one individual could reinforce talking behaviour in another to continue conversing. Although social reinforcers are not limited to only conversing, reinforcing effects vary over time and is seen in the context of the environment, deprivation, and experience. Positive reinforcement could be produced by listening to the talker, agreeing, and non-verbal behaviour as nodding or smiling. Negative reinforcement could be exemplified as verbal complaining or interrupting the talker, simply not responding, or turning away (non-verbal) (Bento et al., 2020). In the example of two radical or extremist individuals, social reinforcement could happen through interaction, which could lay the foundation of ideological right-wing discussions or encouragement. Also, negative reinforcement for situations with people of other views does not coincide with their political/ideological standpoint, such as avoiding discussions in public but rather having them online.

In comparison to escape, avoidance is avoiding a situation altogether, as to say there is no stimulus present in the environment that led to an escape. The potential discomfort of the situation on its own that the individual has experienced earlier evokes the behaviour. Avoidance is therefore based on previous learning history (Pierce & Cheney, 2017). Even in some cases, the individual might place punishers to silence those in opposition. However, a punisher in behavioural analysis has a functional definition, and the presentation of aversive stimuli can only be called punishment if it is presented contingent on unwanted behaviour and that the unwanted behaviour lessens in frequency. In that sense, punishers always work; if it doesn't, it is not a punisher (Pierce & Cheney, 2017). However, learning the history of an individual with a lot of negative reinforcement, being exposed to aversives might impact the individual by affecting the value of other stimuli of reinforcement like social reinforcement, among others.

Although the preliminary research studied rats as its main test subject, BA has come to prove useful for individuals with developmental disorders by use of functional analysis (Iwata et al., 1994). BA has also been used to improve performance by implementing systematic positive reinforcement among workers (Doll et al., 2007; Miller et al., 2014; Rose & Ludwig, 2009). Although the first two examples are from fields that are well established, BA has also been implemented in the field of terrorism to uncover patterns of behaviour among violent extremists (Gill, 2015; Gill et al., 2014). As shown in this thesis, some studies have been published on social network analysis and terrorism from a behavioural science perspective on how normative individuals radicalise and move towards violent extremist actions. As in the field of social network analysis, the process of social reinforcement could be defined as a situation between individuals where one of them requires multiple prompts before adopting a new behaviour or opinion (Bento et al., 2020). The field of extremism and terrorism is undeniably complex. Although there is not necessarily one single component that drives an individual to terror, social contact between radical individuals, i.e., social reinforcement, might contribute to the act of terror.

An organism goes through three levels of selection, phylogenesis, ontogenesis, and cultural. As the organism goes through phylogenesis, or natural selection, it acquires abilities that last in the timespan of the species. The selection in ontogenesis, or consequences of behaviour, selects behaviour through reinforcement that adds skill in that specific individual's behavioural repertoire. And lastly, cultural selection is the selection of behaviour that has value for a group. When one of these three, be it genes, response classes, or a set of contingencies, meets the requirement of the environment over time, a structure will form. Structures are the networks of relations that carry information about a specific adaptive system (Sandaker et al., 2019), for example, a social system like extremist ideology. So, networks of contingencies in a culture of extremist ideology could span longer in time than its members. Therefore, the system can be defined as complex. The network of contingencies coevolves and are nested together at natural, behavioural, and cultural levels.

These contingencies are called meta-contingencies and derive from the individuals or group with interlocking contingencies that produce an aggregate product selected by a receiving system (Sandaker, 2009). The individual in this thesis is Anders Behring Breivik and the group his network. The aggregate product could be defined as the far-right wing discussion of ideals or politics, given from one individual, which in turn is selected or refused by the group. The receiving system might be understood as the other individuals in society as the receiving system. In this way, the collective of individuals affects individuals and, in turn, become affected by the group, it defines as cultural selection. The organised networks of meta-contingencies can be defined as structures regarding which individuals have contact and which individuals are not in contact with each other. If these structures of relations, contingencies, or cultural selection can be uncovered, Social network analysis can give some predictive value to the system in question. (Sandaker et al., 2019).

Therefore, I will argue that combining the fields of behaviour analysis, social network analysis, and complexity theory is necessary to shed light on the complex relational interactions and shaping of normative individuals into lone-actor terrorists. Combining different sciences so that one might better understand each other and various subjects are called consilience. The term was coined by Wilson (1998), and the goal of this thesis is to promote consilience, however, small the contribution.

Scope review of social network analysis of lone-actor terrorism

The scope review is meant to overview the literature and uncover the number of articles on the subject of network analysis, research questions, and variables used in the study.

The search for literature in the scope review identified 40 texts; after duplicates were removed, the total was down to 31 texts. Screening excluded 26 texts, and of the remaining five were assessed in full, excluding 1, which left four texts that were to be included in the review. For this scope review, the criteria for inclusion of studies were that they included social network analysis in the field of extremism and terrorism,

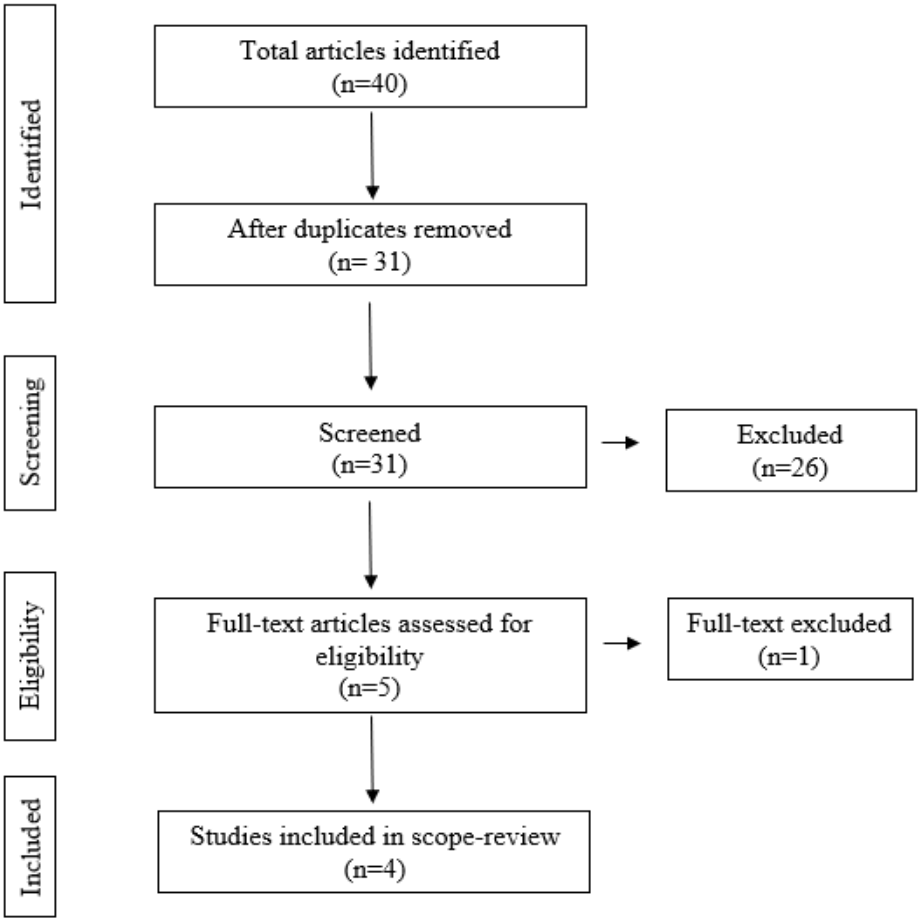
mainly lone-actor terrorists. The database used was Academic Search Ultimate. The specific search criteria were published between 2001 -2021; the text had to be published in an academic journal and written in English.

Search words were restricted to the abstract of the published articles included and search hits; "Lone Wolf AND network analysis" gave four hits. "lone-actor Terrorists AND network analysis" which gave three hits. "lone-actor Terrorists AND social network analysis" showed one hit. "Lone Wolves AND Network" gave four hits. Lone Wolves and Network analysis" showed one hit, and "Network Analysis of lone-actor terrorists" gave zero hits. "Lone Actor Terrorists" gave 26 hits. For oversight of the scope review process, see Figure 1.

In this thesis, one of the four articles (Caspi et al., 2012) has focused on groups rather than individuals. This article was included because the data of the far-right wing groups were collected from 1990 to 2008, which is close in time to the acts of lone-actor Anders Behring Breivik. It could prove helpful to see groups of American right-wing movements in the bigger context of what transpired in Norway on July 22nd, 2011. For oversight of the scope review process, see Figure 1.

Figure 1.

Flowchart describing the selection of articles included in scope-review.



Results

The information about the articles included in this scope review of Clemmow et al. (2020), Gill et al. (2014), Hofmann (2020), and Caspi et al. (2012) is presented in Table 1. The table includes hypothesis and research questions, number of test-subjects, central topic, variables, and results.

Table 1.

Scope review of social network analysis and lone-actor terrorism literature.

Author (Year)	Hypothesis / Research question(s)	N	Central topic	Variables	Results
Clemmow, Bouhana, Gill (2020)	Uncover person–environment interactions could typify the relationship between propensity, situation, and network components of a lone- actor terrorist.	125	Cluster analysis and risk analysis.	• Spouse/partner was part of a wider movement • Face-to-face interactions with members of a wider network • Virtual interactions with members of a wider network • Others involved in the procuring of weaponry/technology • Someone else knew about the offender's research/planning prior to the event • Member of a small militant group • Tried to recruit others • Claimed to be a part of a wider group/movement • Rejected from a political group	Four person-exposure patterns were revealed: solitary, susceptible, situational, and selection. • Solitary does not indicate pursue of terrorist acts. • Susceptible reveals a link to mental illness. • Situational demonstrate stressors as a contributing factor for violent action. • The selection reveals high leakage of planning/ideology and antecedent violent behaviours.
Gill, Horgan, Deckert (2014)	• Is the network aware of the terrorist's intent? • Do other conspirators partake? • How socially isolated? • Is there a difference between lone actors and groups? • Are there differences between lone-actor terrorists based on their ideology, or network connectivity?	119	Sociodemographic network characteristics and antecedent behaviours lone-actor terrorists. Examines whether lone-actor terrorists differ based on their ideologies or network connectivity.	• Relationship Status and Family Characteristic • Awareness of intentions • Social Isolation • Behaviours Within a Wider Network • Link to a Wider Network	• There was no uniform profile identified. • Others knew about the lone-actors extremist ideology views, and/or intent to engage in violence. • Many but not all lone-actor terrorists were socially isolated. • Lone-actor terrorists regularly engaged in detectable and observable activities with a wider group, social movement, or terrorist organisation. • Lone-actor terrorist events were rarely sudden and impulsive. There were distinguishable behavioural differences between subgroups.

Table 1. Continued

Author (Year)	Hypothesis / Research question(s)	N	Central topic	Variables	Results
Hofmann (2020)	How "alone" are lone-actor terrorists?	2	Social network analysis in four dimensions; Full, Ideological, Signalling, Support.	• Size • Avg. degree • Density • Global clustering coefficient	• Both cases were part of ideological, operational, and communication e-networks. • Both engaged in signalling behaviours with fair significance. • Both lone actors relied on small clusters of tightly knit individuals which they discussed; ideology, signalling intent, and material / non-material support. • Network analysis shows signalling behaviour in both cases. • Both cases relied on a fifth to a fourth of their network for support. • Acquaintances of both subjects were most important in the network. The family had a diminished role in their respective networks.
Caspi, Freilich Chermak (2012)	• Networks are decentralised. • The group Aryan Nations will be critical to the networks • Groups that share ideology will be linked. • Centralised groups will be associated with more deaths. • Central groups will be ideologically integrated. • Org size will be associated with centrality. • Org age will be associated with centrality.	13	Social network analysis of domestic white supremacists in the USA between 1990 - 2008	Network-level: • Density • Centralisation Node level: • Degree of density • Closeness centrality • Betweenness centrality	• Networks are decentralised but ideologically integrated • Centrally located groups have more deaths • Networks of white supremacists are non-cohesive.

Note. The table shows a summary of all included articles in the literature review.

Research questions

Clemmow et al. (2020) researched the possibility of person-environment interactions that span the lone-actors offending process that could typify the relations between propensity, situation, and network - by using cluster analysis and risk analysis. Gill et al. (2014) analysed 119 lone-actor terrorists' social demographic and whether the perpetrators differ based on ideology and network connectivity. The research question of Hofmann (2020) was how lone these so-called lone-actor terrorists was two years before the violent acts of the two individuals, based on their ideology. Caspi et al. (2012) article on violent supremacist groups had several research hypotheses; networks are decentralised, the Aryan Nations group will be critical to the networks, groups sharing ideology would be linked, centralised groups will be associated with multiple homicides, centralised groups would be ideologically integrated, and org. size and age will be associated with centrality.

Variables

To focus this thesis on network analysis of lone-actors, not all variables from the articles in the scope review are included. Clemmow et al. (2020) were sorted into three analytical meaningful components; propensity, situation, and network. For the sake of the review, the 23 variables in the propensity category, and 33 variables in the situation category. The network category had 14 variables in total; when the variables not of interest to this thesis were discarded (n=5), nine variables were included. The nine variables included of the network category in Clemmow et al. (2020) were; spouse/partner was part of a broader ideological movement, the perpetrator had face-to-face interactions with members of a more comprehensive network, the perpetrator had viral interactions with members of a wider network, others involved in the assistance of acquiring guns/technology, others knew about the perpetrator's research and planning face prior to the violent act, the perpetrator was a member of a small militant group, perpetrator tried to recruit others, perpetrator claimed a member of a broader group/ movement of

right-winged, Al-Qaeda, single issues, or other ideology, and the perpetrator was rejected from a political group.

The variables used by Gill et al. (2014) were based on a codebook including sociodemographic information. Of the total variables, five were included in this thesis, relationship status and family characteristics, awareness of intentions, social isolation, behaviours within a wider network, link to a broader network.

Hofmann's (2020) variables and the categorising of the networks in full, ideological, signalling, and support were size of the network, avg. degree, density, and global clustering coefficient.

Lastly, Caspi et al. (2012) had five variables: Density and centralisation in the network level, degree of density, closeness centrality, betweenness centrality in the node level.

Summary of results

Clemmow et al. (2020) uncovered four person-exposure patterns (PEPs); solitary, susceptible, situational, and selection. The solitary PEP does not indicate pursue of terrorist acts; the susceptible PEP revealed a link to mental illness, the situational PEP demonstrated stressors as a contributing factor for violence. The selection PEP revealed high leakage of planning activities/ideology, and antecedent violent behaviours.

The results of Gill et al. (2014) found that there was no uniform profile of perpetrators, others knew about the lone-actors extreme ideology/intent, and many lone-actor terrorists were socially isolated. Further, they discovered that lone-actor terrorists regularly engaged in detectable activities with a wider group, social movement, or terrorist organisation. Lastly, the finding describes a lone-actor as scarcely impulsive or sudden and that there was no distinguishable behavioural difference in sub-groups of them.

Of the two test-subjects of Hofmann (2020), results show that both cases were part of ideological, operational, and communicative networks. The perpetrators engaged in signalling behaviours with fair significance, and they relied on small clusters of tightly knit networks to discuss ideology, signalling, intent, and material/non-material support. Both subjects showed signalling behaviours and relied on a fifth to a fourth of their social network for support. Lastly, the family had a diminished role in their respective networks as acquaintances were most important.

Research produced by Caspi et al. (2012) showed that the networks of white supremacist groups were decentralised but ideologically integrated, centrally located groups had more deaths, and the network of white supremacist groups are non-cohesive.

Discussion of results

Clemmow et al. (2020) found that the personal-exposure-pattern of being solitary did not necessarily mean that the individual pursued terrorist action. In contrast, Gill et al. (2014), on the other hand, found that many of the perpetrators were lonely. Diversity of both finds could be explained by difference in coding of the network analysis, or variation of the selected individuals in the studies. Hofmann (2020) defined his two subjects as part of small tightly knit networks where the perpetrators discussed ideology and plans. He questioned whether they could classify as “lonely” in the planning process leading up to their violent acts. However close family had a diminished role in their networks, and acquaintances were more important. It could mean that they were "less social” in their day-to-day networks in some capacity, and rather put acquaintances of extremist ideology as their primary network. Although Caspi et al. (2012) focused on white-extremist groups, and not individuals, found that they were decentralised who had an integrated ideology, however, the different groups were non-cohesive. This may indicate that the groups were lone, and for the most part, kept to themselves.

The finds of Clemmow et al. (2020) indicated that the situational person-exposure pattern defined stressors as a defining factor in the perpetrator's acts. Although not discussed in detail in the other articles, the perpetrators likely felt a substantial amount of stress in the extremely violent acts they orchestrated, as adrenaline is a normal human response for fight or flight scenarios.

It was uncovered in Gill et al. (2014) that there was no uniform profile of all the perpetrators in his study. Even so, three articles included here have one particular trait in common: a substantial amount of leakage/signalling behaviour about the planning, intentions, ideology, or the act of violence itself. This is a significant find, as this could be defined as a marker of behaviour that government officials might be able to pick up on when trying to intervene in extremist or terrorist acts.

Clemmow et al. (2020) were the only one of the four included articles that found a link to mental illness. It is not unlikely that some of the subjects across the four articles had some sort of mental illness as there has been more focus on mental illness as a contributing factor for other kinds of behaviour. However, that is a topic that won't be pursued in this thesis.

The variables in the literature review are differently operationalised but deal with the same characteristics, such as signalling behaviour.

My contribution

Amongst other writers, Hofmann (2020) has questioned the "loneliness" of single-actor terrorists, which aligns with the concept that no networks are closed off, but it is a matter of how open or closed. This is seemingly relevant for this thesis about Anders Behring Breivik's social network prior to his solo violent acts in Norway on July 22nd, 2011, as is the topic of this thesis.

Therefore this master thesis will rely on the same principles and variables found in the scope literature; however, the included literature (Hofmann, 2020) will be more central. This is due to the difference in the authors defining their variables; although the other studies have more variables,

Hofmann (2020) is focused on two lone-actor perpetrators and have operationalised his variables accordingly. However, this will not be a replication of Hofmann (2020) but a study in its own right implementing a similar framework. The thesis will use variables as 1) full, 2) ideological, 3) signalling, and 4) support networks to analyse Anders Behring Breivik's social network.

1) The full network consists of the perpetrator's social circle of friends, family, acquaintances, and co-workers. This network will work as a control to see a difference in exchange of extremist ideology, information about planning an attack, and who might have supported the attack (intentional or unintentional). 2) Ideology networks will consist of the social circle in which the perpetrators have discussed extremist far-right ideology, or worldviews. This network includes the larger network, both violent and nonviolent conversations between two or more individuals. This part of the network might help find sub-groups that the perpetrator had ideological discussions with during radicalising violence. 3) Signalling network consists of the individuals which the perpetrator shared some form of information about the terrorist act. This info may be related to the research, planning, or execution of the act itself. 4) Support network consists of individuals that provided material or non-material support related to research, planning, or execution of the terrorist act. The support might be intentional, the supporter knows of the possible terrorist act, or unintentional, the supporter is unaware of the plans by the perpetrator.

The main contribution of this study will be 1) putting behavioural analysis on the agenda of extremism and terrorism research in a Norwegian demographic. 2) See if schedules of reinforcement could explain the terrorist behaviour of Anders Behring Breivik based on network data. 3) Contributing to possibly giving a new behavioural analytical understanding of lone-actor terrorists.

Method and Data

Social Network Analysis

This thesis aims to uncover structures of social interactions, and more specifically, try to define and give a better understanding of social reinforcement and its effects on extremist behaviour. The method most suited for this task is social network analysis, as the method focuses on relational ties between individuals and attributes of individuals like gender and age. As such, the method is widely used in the field of terrorism, although the research has mainly been focusing on terror groups instead of lone-actors (Gill, 2015). However, there are also questions being posed by governments and media that question the loneliness of these lone actors. The most current and vital study is Hofmann (2020), and he researches the question of "how lone are lone-actor terrorists?" implying that there is a network behind the façade of the lonesome aspect of the lone-actor.

In the digital day and age, the world is, in some sense, growing smaller as we are more interconnected than ever before, and it is hard not to be in some form of social interaction, be it digital or physical. Firstly, this is in part why the questioning of loneliness of lone actors becomes relevant, are they part of a scarce network? If so, in what sense? How dense or tightly knit is the network? Secondly, we leave traces of our activities online from our digital devices, and we are filmed in the streets by surveillance cameras if we are at the store or meeting friends for coffee. These data sources could be proven beneficial to map out structures of social interaction that leans towards radicalisation and help countermeasures of a pre-emptive nature if utilising social network analysis.

In the matter of the lone actors themselves, they will most likely strive for the knowledge and technical insight to counter the surveillance on digital platforms by being less visible on digital media or omitting the digital devices altogether. To what degree this can be done is another research question, and

this thesis will focus on the functions of Breivik's social reinforcement that most likely did occur in three years of the advance of July 22nd, 2011.

The nature of the network of lone-actor terrorists is often embossed by the need for some level of secrecy about their extreme/terrorist activities; these are called “dark” networks. Hofmann (2020) described three central challenges with the nature of dark networks. 1) They are dynamic networks, so the support of the network might change rapidly, say, in a situation where Police or other officials try to uncover the network and prevent their activities. 2) The network data might be incomplete, as the “dark” element suggests the network wants to hide away and keep secrets about their activities. 3) Lastly, the boundaries of the networks are unclear as to whom it includes. Taking the first and second challenges into account, it is hard to say whether the whole network is accounted for and if some nodes have cut off contact and hid their traces of connection with uncovered assailants not to get exposed themselves. I would argue that these three challenges are still significant, especially in the field of law enforcement. In this thesis, they are also relevant, but in some sense, the network three years before July 22nd, 2011, is more of a permanent product now as opposed to when the violent act was new, as the sources of data in this thesis are archives of information, books, videotapes, and scripts from the trial and such.

Identification of case-studies

The study focuses on terrorist acts in Norway, and as such, the most relevant cases are Anders Behring Breivik and Philip Manshaus, as they were lone-actors. Until Breivik's actions on July 22nd, 2011, there had not been acts of the same ilk since the second world war, and far-right extremism as a subject made its way into the Norwegian populous through media channels. This might have been one of the contributing factors that led Philip Manshaus to act in a similar far-right extremist manner on August 10th, 2019; although this is not something this thesis will discuss further, the case will be relevant for future research on violent extremism, particularly for Norway. Either way, both cases are relevant;

however, at the time of writing, the July 22nd incidents are ten years old, and in that period, academics (Gill, 2015), writers (Borchrevink, 2012; Seierstad, 2015) have had time to do research, write and try to understand the case. More data gives a greater basis for a master thesis as many official documents are exempt from the public. Students or researchers might be given access to some of the archives, but not entirely as it would demand a security clearance from the authorities. In Philip Manshaus, the incident is significantly more recent, so the case has not yet been archived in the National Archives, making it impossible to access court documents.

For these reasons, only the case of Anders Behring Breivik is selected for this thesis as it focuses on a Norwegian demographic, only the two cases of lone-actor violent extremism have occurred, and the lack of data accessible Manshaus' case for a master's thesis.

Data collection

The data obtained and included in this thesis is from the National Archives, hereby the July 22nd commission archives (Utredninger, 2011a), (Utredninger, 2011b) and the Norwegian Broadcasting Corporation's (Norsk rikskringkasting, NRK) videotapes of the trial of Anders Behring Breivik (Norsk rikskringkasting, 2012). To supplement, the thesis relies on books about Breivik himself and the acts (Borchrevink, 2012; Gill, 2015; Seierstad, 2015; Stormark, 2012) and already public transcripts of the trial. Additionally, there will be used journal articles (Ravndal, 2013), different news articles (Eikesdal et al., 2011; Tv2, 2011), as well as blog a forum (Bodissey, 2011). All these sources were triangulated to increase the reliability of the data.

For access to the archives July 22nd commission and the Videotapes of the trial, an application had to be sent to the National Archives. The application gave specification of role and research questions and a what series, files, and folders of the archives one wants to access. In this case, it was

necessary to describe the roles as the student uses the extended credibility of their supervisor for their study.

The data found in the National Archives was not complete and referred to mostly phone calls done by Breivik approximately three months prior to the terrorist attack (May 15th, 2011 – July 22nd, 2011). Regarding the videotapes, nothing about Breivik's network was examined, only mentioning the 240 reports about Breivik's online activity without explaining it closer.

The Oslo police department has more data concerning Anders Behring Breivik's online activity. However, it is not available for this masters' thesis as the data is involved in the police investigation and criminal case of Breivik and information regarding these files are not commonly shared with the public. The unavailable data was collected by The National Criminal Investigation Service (KRIPOS) on orders of the Oslo Police district in 2011 and spanned a timeframe of seven years (2004 – 2011). My inquiry of access to the case files in possession of the Oslo Police department and KRIPOS, hereby the Police Directorate, was an application similarly describing the thesis as the one sent to the National Archives. Confirmation from my supervisor and associate professor, the thesis outline, as well as a contract of supervision signed by student, supervisor, and study coordinator were sent. The Police replied that access to the case files was not possible for this project. So, the thesis had to proceed knowingly without additional data and therefore had to focus on published books and the material accessible in the National Archives. The thesis utilises descriptions from books; however, these books are triangulated with other sources to confirm the data. Data were therefore obtained from the best valid sources available.

Examined networks and coding guidelines

The different types of networks that are being assessed are full, ideological, signalling, and support. The time period in question is thirty-six months prior to Breivik's violent acts on July 22nd, 2011. This way of categorising networks is based on Hofmann (2020).

As data was fully collected, the *coding guidelines* were formed based on Hofmann (2020) criteria and determined as a relational tie in each network.

Full network. It consists of the perpetrator's social circle of friends, family, acquaintances, co-workers, and other networks. This network will function as a control to see differences in exchange of extremist ideology, information about planning, and who might have supported the terrorist attack, be it intentional or unintentional.

Ideology network. Consists of individuals, the perpetrator exchanged extremist far-right ideology. This network includes a larger part of the whole network as the perpetrator could have had conversation with individuals in smaller sub-groups. The coding guidelines identifies as evidence of social interaction between the perpetrator thirty-six months prior to July 22nd, 2011. The contact may be single instants as social reinforcement could occur even though the communication lacks a relational tie.

Signalling network. It consists of individuals with whom the perpetrator had shared some information about the terrorist attack. This can be elaborate or smaller ques or hints and could be related to processes of the operational stages of the violent act as; research on the topics of ideology, planning the violent act, or the execution of the terrorist attack. The signalling behaviour of the perpetrator may be intentional or unintentional. The coding guidelines of the signalling network defines as evidence of intentional or unintentional signalling behaviour of the lone-actors' intentions of research, planning, or execute a terrorist act. The criteria for inclusion in this network are based on the researcher's reasoning, as in "woulda neutral third party be alarmed enough by the signalling the authorities if information about the perpetrator's plans were given to them".

Support network. Includes individuals that assisted the perpetrator material or non-material support in the operational stages of the violent act as; research, planning or execution of the terrorist act. The support is defined as direct aid and may also be either intentional or unintentional. Coding

guidelines here are defined as evidence of individuals who directly supported the perpetrator intentionally or unintentionally as part of planning, giving instructions, or executing the terrorist act.

Network measures

The analysis will be divided into two levels of Network-level and Ego-level characteristics and will look at structures such as size and avg. degree centrality, density, global clustering coefficient (GCC), nDegree, constraint, and ego betweenness.

Size is the number of contacts in the perpetrator's network known for this thesis and gives an account of the possible connections that could deliver social reinforcers for Breivik conducting a terrorist attack. Avg. degree centrality indicates an average of relational ties a node has with the other nodes in the same network. Density is a measure of cohesion in the network that gives a score between 0, indicates that no actors within a network are connected, or 1, suggests that all actors are interconnected. In density measures, one could say that it describes the structures of ties, and the absence of a relational tie could indicate a structural hole in the network. Global clustering coefficient is defined as a measure that indicates the clustering of the network, as to say how tightly knit a network is (Hofmann, 2020). The degree of freedom a node has in its network is measured as constraint. Constraint is defined as the position of a node in a network that determines the potential for brokerage of social capital. Say, in a network where a single node is brokering (capitalising on social relations) four other nodes; the network is not sharing information unless it goes through the one ego node connecting the other four. By doing this, information can be better controlled by the ego, and the amount of entropy could therefore be lessened. Ego betweenness measures the percentage of ties with the shortest path that travels through ego (centre node) (Borgatti et al., 2018), so as the example of the ego and the four other nodes, the ego betweenness would be high for the centre node.

Table 2.

Social network analysis measures and their implications for social reinforcement.

Type	Description	Implications for Lone Actor terrorism
Size	Number of nodes in a network.	Possible contacts that can deliver social reinforcement.
Avg. Degree centrality	Centrality measure: the average number of relational ties a node has.	Although they are always open, networks can be open or closed to a certain degree, and communication flow may therefore vary.
Density	Cohesion measure between 1 and 0, where 1 indicates all nodes are connected, and 0 indicates no connections.	Describes the structure of ties, and the absence of a relational tie could indicate structural holes in the network.
GCC	Measure clustering of nodes in the network.	Indicates to what extent a network is connected or divided nodes are in a cluster. A high coefficient indicate less division in clusters.
nDegree	Measure between 0 and 1. 1 indicates contact with all other nodes in the network. 0 indicates no contact with other nodes of the network.	The lone-actor could be the only node with contacts throughout the whole network. If nodes have very different nDegree score, it could indicate possible capitalising of social relations in certain nodes.
Constraint	How constrained a node is by its network. The low score of constraint means a high degree of freedom.	Decides the amount of possible brokerage of social capital the ego-node has. Constraining information between different nodes and utilising the social capital could be understood as receiving social reinforcement and avoidance behaviour.
Ego bet	Percentage of the distance between nodes that move through ego.	Indicates centrality of nodes and possible brokering.

Ethical considerations

The individuals included in the framework of the networks might be able to recognise themselves as a part of the particular networks if they had been in contact with Breivik three years prior to July 22nd, 2011. However, the individuals in the networks are given arbitrary numbers in the network analysis and will not be recognisable for others. The outline for this thesis has been approved by Norwegian Centre for Research Data (NSD), which required information regarding the potential processing of personal data. It was concluded that the thesis outline described a method that did not violate the rules of anonymisation of personal data and was therefore deemed anonymous, and no further case follow-up was needed (see Appendix).

The National Archives has also approved this research project for insight in archives regarding Anders Behring Breivik, respectively files from the July 22nd Commission, and clips of NRK's recordings of the trial.

In a larger perspective, it might be more unethical not researching terrorism as it can have fatal consequences for society. In behavioural analytical research, much has been done in the US and UK, among others. However, this is not the case in Norway, where this kind of research is almost non-existent. Therefore, I see it as an important contemporary subject and a behaviour analytically important subject that needs more research.

Results

Case-study: Anders Behring Breivik

Breivik's relations in earlier life with his family has been constrained. His mother had an ambivalent relation with him – holding him close in affection, and then pushing him away as to say that he demanded too much of her. Breivik's parents divorced when Anders was two years old, and his father cut contact with him altogether when Anders was sixteen. This was due to Anders' involvement in the street-art environment which led him to being caught by the Police three times. Friends of the family and neighbours have also recalled Anders acting out as a child to prove himself, as he was a shy boy, with very few friends (Borchrevink, 2012; Seierstad, 2015).

When caught by the Police the third time for his street art shenanigans at age sixteen, Anders was suspected of betraying the street-art group, and therefore was frozen out. The street art environment was a part of the 1990's hip-pop movement where he wanted to be a respected member. Again, he wanted to belong to a social circle but was given the cold shoulder (Borchrevink, 2012; Seierstad, 2015).

In his late teens, he dropped out of high school to found his own company with the aims of becoming a millionaire. At the same time, Anders was active in the progress youth party (FPU) and short after enlisted in the progress party (FRP) itself. He was primarily active online in the youth group but rarely spoke up in party meetings. When the time came for electing representatives from the youth party to the Progress Party, Anders was once more left out. Although he had established himself online, he did not do so in public, and the veterans choosing representatives thought him quiet and a bit odd; again, he did not quite reach his goal and was not selected (Borchrevink, 2012; Seierstad, 2015).

After he stopped being active in FPU due to not being noticed, Breivik moved over to different internet forums and debated far-right politics. One of these forums were document.no, where he also had ambitions. Breivik felt muzzled by the Norwegian press, as they would not post his meanings in their

papers as readers posts. Therefore, he wanted to make a new ¨free¨ newspaper concentrated around the far right. He thought this would be an excellent opportunity to combine document.no, a free webpage where one could discuss in the forums with other users and the Frp newspaper ¨Progress¨ which was losing attraction. Both the FRP party and the editor of Document.no were not interested in the idea but wished him the best with his plans (Borchrevink, 2012; Seierstad, 2015).

While being active on document.no, Breivik found a kindred spirit in Fjordman, blog writer and publisher on document.no, among others. Breivik praised Fjordman and his work, wanting to contact him to discuss right-wing politics, and on one occasion invited him to a meeting of like-minded right-wing individuals. After the first contact via mail, Fjordman gave Breivik the cold shoulder at every account (Borchrevink, 2012; Seierstad, 2015).

Some of these instances describe what behavioural analysis defines as positive punishment; an aversive is presented to behaviour that another individual does not regard as proper. Although the definition of punishment in BA is functional and behaviour needs to lower I frequency to call it positive punishment. Punishment can therefore cause behaviour to decrease in frequency immediately if the aversive stimulus is potent enough. Over time the potency of punishers may decrease because of overexposure. A life seen through a behavioural scientific lens, aversives, thinned reinforcement schedules, positive punishers, and reinforcement would indeed affect any individual. In retrospect, the life and shaping of Breivik as an individual could be partially explained by these contingencies of reinforcers and punishers might help understand the mechanics of marginalisation, but more importantly, How the shy boy from Oslo west became a killer and terrorist in adulthood.

Terror attacks July 22nd, 2011, Norway.

Breivik parks his rented Volkswagen Crafter at 15:13 in front of the 'H-block' parliament building in Oslo containing a self-made fertiliser bomb. He lights the fuse and leaves the Crafter at

15:15, proceeding to another rental car he had parked earlier and makes drives toward Utøya in the Tyrifjord. 15:25 the bomb near the parliament building explodes, claiming the lives of eight and injuring 209 people. 17:18 Breivik arrives at Utøya by ferry disguised as a police officer; the island hosts the Workers Youth League annual summer camp. Breivik starts shooting at 17:22, and in the span of three hours, 69 participants are shot and killed, and 110 are injured (Gill, 2015, p. 1).

Breivik has described himself as a member of the organisation Knight Templar of Europe. He has emphasised that this organisation and its members are not Nazis and only want political Islam out of Europe through conservative revolution. Initially a part of the Norwegian anti-immigration Progress Party Youth, he has uttered that violence may not have been needed was it not for being censored by the media, among others the newspapers Dagbladet and Aftenposten. Violence was Breivik's, according to himself, last option and that his actions would spark a civil war between nationalists and communists which would create awareness of the threat posed by Islam in Europe (Gill, 2015, p. 148). Breivik was most likely also shaped by earlier events like not being able to climb the ranks in the tagger environment in Oslo in the 1990s and not being noticed in the Progress Party Youth organisation in the early 2000s.

When all accessible data were collected, there were no incidents regarding signalling behaviour from Anders Behring Breivik. According to Seierstad (2015), the perpetrator writes in his manifestoSeierstad (2015) that he intentionally avoided signalling others about the terror act to avoid suspicion from PST or other government officials that could have intervened and stopped the attack. The ‘Signalling behaviour’ has therefore been removed, and the article continues with the dataset of the available parameters; Full-, ideological-, and support- networks.

Presentation and Analysis of Network Characteristics

The following section will present the results of the data analysed in Usenet. The full-, ideology, and support-networks results will be presented in two different levels, respectively Network-level characteristics (Table 2.), and ego-level characteristics and structural holes (Table 3.).

Network-level characteristics

Breivik's full network consist of 24 other nodes (see Table 3.), and the average degree centrality shows that each node in the network approximately had contact with one node (0.909).

Table 3.

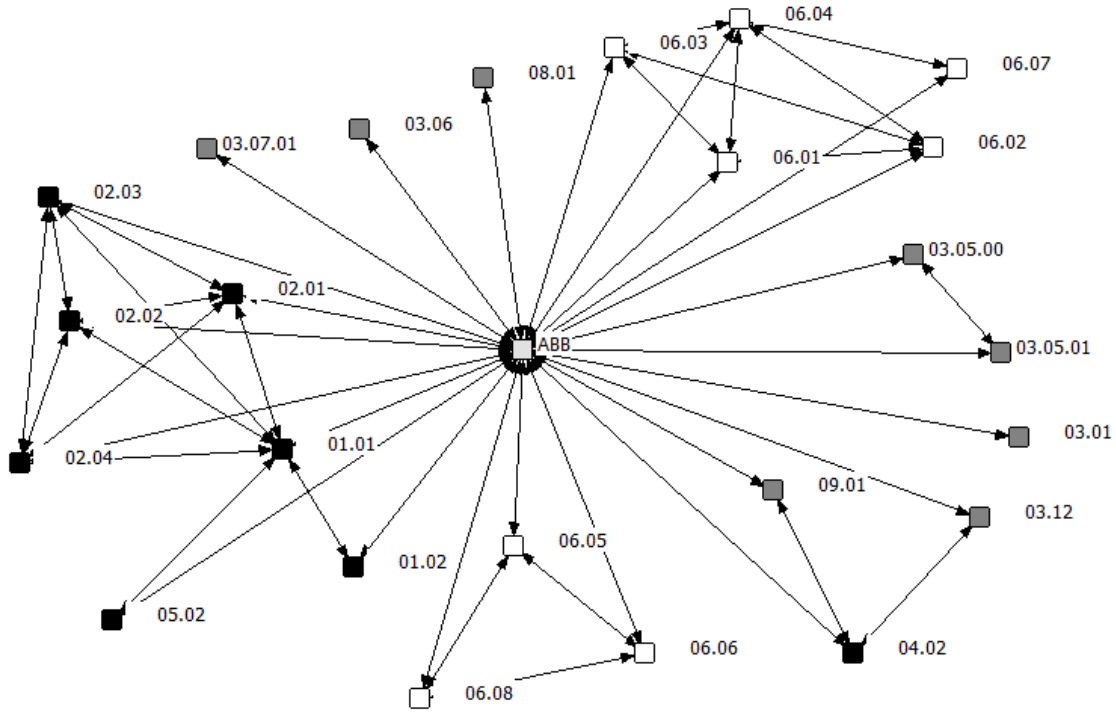
Network-level characteristics across full-, ideological-, and support- networks.

LAT	Network Type	Size	Avg. degree centrality	Density	Global clustering coefficient
Breivik	Full	25	0.909	0.163	0.906
	Ideology	9	0.643	0.458	0.304
	Support	9	0.964	0.250	0.679

One outlier in the network model, node 04.02, although included in the full network category, has ties with the support network, but not part in giving support the node is coded with the full network category (see Figure 3.). The cohesion of the full network as density (0.163), and global clustering coefficient (0.893) gives an image of a network with a relatively scattered structure as the density is fairly low. However, the clustering is more prominent at 0.906.

Figure 2.

Full network of Anders Behring Breivik.



Note. White nodes are the ideological network, dark grey nodes are the support network, black nodes are the remaining network of family, friends, and neighbours with whom the perpetrator had contact.

Both the ideology and support networks have fairly smaller size with only eight other nodes than the perpetrator himself. In the ideology network, the average degree of centrality shows that the nodes had contact with roughly six (0.643) other nodes. Given that the ideology network is fairly small, it has a higher density value of 0.458 than the full network, but the clustering is lower with a score of 0.304. The clustering of the ideology network (0.304) indicates that the perpetrator had discussions of far-right related topics with a fairly low amount of the full network. Some of the nodes are from the same far-right online forums, and the lower degree of clustering may come from the one node in common across all eight nodes are Breivik himself. Breivik has stated that he always tried to keep the online activities to

a moderate level in fear of getting discovered by government officials; combined with the nature of the dark nature of the network, the dataset might not be complete.

Support network shows an average degree of 0.964, which say that the individuals had contact with ca. nine others on average. However, Breivik is at the centre of the network, and the nodes have sparse contact with each other, making ABB a broker that utilises the parts of the network for his benefit and not sharing the social capital. This will be addressed further in the ego-level analysis. As mentioned before, the signalling network is non-existent, at least with the data available for this study, and is not included.

Ego-Level Characteristics

As in the Network level analysis, the number of nodes (size) is the same with 25 in the full network and 9 in the ideological and support networks (see Table 3.).

Table 4.

Ego-Level characteristics and Structural Holes Across full-, ideological-, and support- networks.

Ego	Network type	Size	Degree	nDegree	Constraint	Egobet	Density
Breivik	Full	25	24.000	1.000	0.108	483.000	0.092
	Ideology	9	8.000	1.000	0.342	37.500	0.304
	Support	9	8.000	1.000	0.164	54.000	0.036

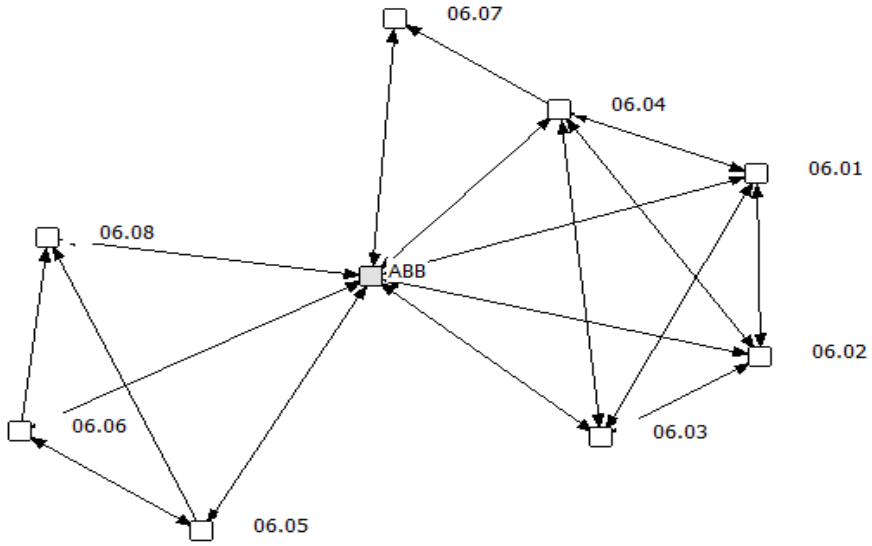
The degree measure shows that ABB had contact with all nodes in the network (Full: 24, Ideology: 8, and Support: 8), giving a degree of 1.000 as the perpetrator had contact with all other nodes. This shows that ABB was at the very centre of the network. The measure of constraint is low in the Full and Support network (respectively: 0.108 and 0.164) and moderately higher in the ideology network (0.342). The constraint measure shows the degree of freedom for the node ABB, and that it is

moderately low means that the perpetrator had a higher degree of freedom from these networks and could operate on his own without getting limited by his networks.

Ego-betweenness score 483.000 in the full network, other nodes in the full network at the highest was 5. This measure tells that ABB was indeed very central to this network and had most likely social capital that other network nodes didn't have access to. One might say that ABB utilised all the benefits from his networks, and at the same time, separated the other nodes from each other. We see the same pattern in the ideological-, and support- networks (37,5 and 54 respectively). Although the ideological network is a bit lower, it is still substantial and shows that ideological discussion could happen without ABB. This makes sense as most of the ideological debates happened online on more extensive forums, and not only in a private chatroom between two individuals. The ideological network is shaped like a bow-tie network (Figure 3.) and shows that ABB was a link between certain nodes and that these nodes communicated with each other to some extent (Density 0.304).

Figure 3.

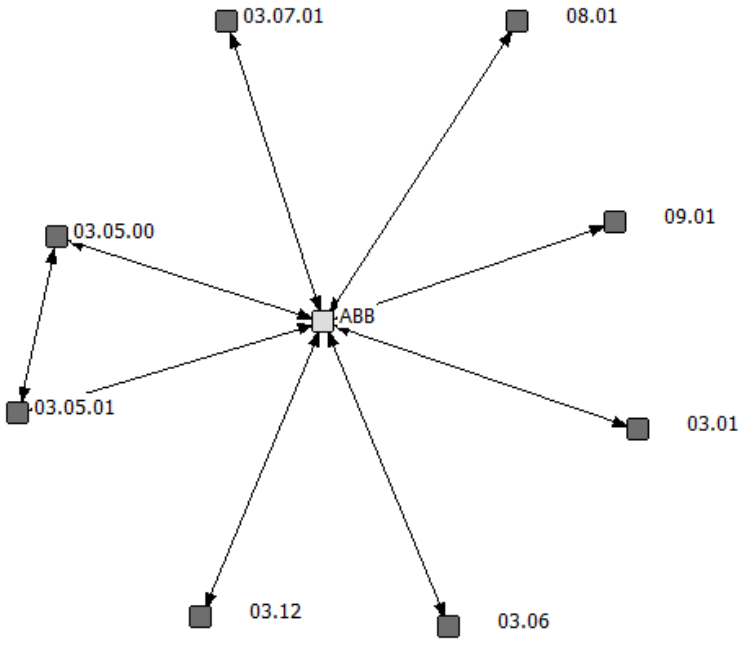
Ideological network of Anders Behring Breivik.



The support network with its ego-betweenness at 54 makes ABB more central in this network. The network has a star shape, and all nodes connects individually to ABB except for the node 03.05.00 and 03.05.01 which is an employee of a business, and the same business as its own node. This is confirmed by the low density (0.036) of the support network, as nearly none of the nodes are interconnected with each other. Again, the density measure is a bit higher in the ideological network (0.304) and could be because of the interconnectedness of the other nodes in the network. The full network is not surprisingly showing a low-density score as this is an overall of all the nodes and networks (ideological and support). These low scores as well as the network models (see Figure 3. and 4.) point in the direction of structural holes in ABB's ideological and support networks.

Figure 4.

Support network of Anders Behring Breivik.



Discussion

Summary of findings

The study question for this thesis was what role does social reinforcement have in radicalising an individual to commit terrorism?

The thesis found the following. 1) The network analysis of Ander Behring Breivik showed a limited network with a substantial number of structural holes. 2) Breivik did not signal his attack and stayed much in control of his networks. This made him a central node of the different networks in another meaning as this being an egocentric analysis. 3) The constraint of the network was low and therefore not limiting Breivik's actions, and gave him more room to plan, train and execute the attack. 4) Breivik's early history and background well into adulthood had possibly been exposed to thin schedules of reinforcement, as well as punishers, this could explain some of the potency of social reinforcers. This ties in with 5) although limited relations with others, radicalisation/extremisation took place, in a behaviour analytical view this could in part be caused by the structures of social reinforcement.

However, it must be clear that this thesis focuses on a single subject, social reinforcement, and that this might be only a single piece of a much larger picture of other types of reinforcers, ontogenesis, phylogenesis and other circumstances that shape an individual to become a terrorist.

1) Many structural holes, as suspected when there was no sign of signalling behaviour, and the fact that Breivik took certain measures for not getting discovered by officials explains these holes. He also kept his network rather small, and the nodes were separated from each other to a certain degree. This, in BA, could be defined as avoidance behaviour, as he instead of taking the risk of signalling his plans avoided signalling entirely. In some sense Breivik decreased the complexity of his network, as he would have little to no control of the information spread if he did signal his attack. Because the social networks could be seen as complex systems, with individuals as nodes continuously interacting and

affecting each other. By withholding information, Breivik lessened the entropy (chaos) in the system, to his own benefit, as being discovered could be seen as an aversive stimulus in a behaviour analytical perspective. And less entropy gave him better oversight of his network. These contingencies of reinforcement and aversives could be understood as a common structure; many contingencies melded together to make out the structure of the network and affecting the actions of the individuals in it. However, the spread of terrorism ideals, and in turn behaviour, does not seem to spread from person to person as the cause, but as meta-contingencies that are intertwined. In that sense, the positive reinforcers and the aversive stimuli presented by the nodes in the network, and the missing relations, enforce and mitigate certain behaviours. This can be understood in a complexity framework as the emergent properties of a system, and that the mitigation of behaviour by punishers or aversives/ positive reinforcement moves the network between the states of entropy and equilibrium. However, a complex system might be built up by smaller complex systems, as in systems within systems. A complex system can therefore have different levels of entropy and equilibrium and is linked to the different levels of reduction, as what scope is the scientist viewing the system with. For instance, in Breivik's networks, there are different amounts of interaction between nodes, i.e., the structural holes are a lot more common in the support network than in the ideology network. Therefore, one can say that there are different levels of complexity in the support and ideological networks.

This is intertwined with point 2), communication flow of the network was restrained as Breivik did not signal the attack intentionally, at least by the parameters of this thesis and data available. This is a find that contradicts the findings of the articles included in this thesis' literature review, where signalling was a common trait(Caspi et al., 2012; Clemmow et al., 2020; Gill et al., 2014; Hofmann, 2020). It might be argued that this could be due to the increasingly digitalisation, and therefore more complex society. This could be only in the case of Breivik, although awareness of personal data and

privacy is becoming more relevant and that future extremists might not signal their attacks is likely. As a by-product of this Breivik was very central in his own networks, as we can see in the Ego bet score, at least in the support network, somewhat less in the ideological network. However, Breivik gained control of his network as mentioned, this way exploiting the social capital of each individual node in some form of brokering, and also kept suspicion at bay. Had the supporters known about each other, they might have reported a suspicion to the PST.

3) By keeping the nodes separate Breivik gained headspace to plan, train, and execute the attack as the constraint of the network was low. One can imagine this is more of an ideal situation when the operation is of a dubious nature. When asking the question of how the terror attacks all came to be, a span of three years of network analysis is not necessarily enough, but it can paint a partial picture of the circumstances leading up to the attack. Also, the nature of the dark networks in Breivik's case could hold extra information as the dataset might not be complete, but the data used in this thesis utilises what was available.

However, the scarce network that was uncovered might also support the argument that Breivik was marginalised. This process could possibly be better understood with the taxonomy of behavioural analysis, as to what the antecedents and consequences of behaviour that might lead to marginalisation and in turn radicalisation and or extremisation.

As mentioned in this thesis and as point 4), his early history of most likely thin schedules of reinforcement and experience of punishers or aversives is likely to form an individual in one way or the other. From a young age, through his youth and into adulthood, Breivik experienced rejection, which can be aversive for an individual, so as to say that he wanted to belong to something, prove himself or be noticed as he was marginalised might have made the reinforcing value of social stimuli higher. In addition, the forums which Breivik discussed right-wing ideology and politics were weighted in the

favour of a right-wing mindset, no matter how radical or not. This gave way to an arena where Breivik could discuss merely unchallenged in his beliefs. So, even though a single compliment by others on his posts might have reinforced this behaviour of posting political statements of anti-Islam etc.

Which leads to the final point 5) even though the networks had structural holes, Breivik's behaviour could have been reinforced and driven further even though the individuals complementing or partaking in a discussion was not as radical as he was, he could impress and finally be an authority for his peers. As in a post on the webpage Gates of Vienna (Bodissey, 2011) in 2008, Breivik criticised some of the most active members of the forum for not discussing deportation of Muslims out of Europe. This was not something that the four members of the forum liked to discuss, as they deemed it inappropriate. At this instance, one could say that Breivik was already more radical or extreme, or he wanted to impress some of the most established members of the forum. Either way both instances could be potentially reinforcing events for Breivik. This points in the direction that one might not have to discuss ideology with someone more radical or extreme than oneself to become more extreme. Breivik had structural holes in his network, and yet the radicalisation process still occurred. It seems like the structures of the network, however small they were, had an effect on the radicalisation process. In other words, Breivik received potent reinforcement even though they were not necessarily more radical, that may have encouraged radical thinking, writings in the manifesto, and then leading to terrorist behaviour. This definition is based on the fact that Breivik had a discussion in 2008, three years prior to the terrorist attack, with individuals seemingly less radical than himself, and the terrorist attack would be defined as more extreme than discussing on an online forum.

It must be emphasised that although social reinforcers might radicalise and extremise an individual, it is just one facet of the total making of a terrorist and that other variables, undoubtedly, also affect an individual. However, it is the understanding of this thesis that it is the total structures of social

reinforcement, and other kinds of reinforcers, in a network as a complex system that could explain a radicalisation process.

Limitations and future research

Of the clearest limitations of this thesis is the nature of the incomplete datasets. The data that was available at the time of writing was the files from the National archives, books by Seierstad (2015), Borchrevink (2012), and Stormark (2012). Knowingly the Oslo police department had more data on Breivik's online activity, but for this thesis, they were not available. For that reason, the future research must aim to include this/these datasets to say if what was included and concluded in this thesis has validity. A proposition for this to be done, a doctoral dissertation with the collaboration of the Oslo police department might be the answer. Inclusion of behaviour analysis in a case of terrorist behaviour in a more temporal proximity might also be beneficial, instead of looking at only permanent products and the aftermath of terrorism.

Manaus will also need to be assessed in the same fashion and compared with the results of Breivik to better say if there are similarities that might be generalised to other terrorists. However, it must be emphasised that only two case studies are not necessarily enough as test subjects. One will also see the need to reach beyond the Norwegian demographic and compare results with other articles like Hofmann (2020).

One of the hopes for this thesis is that, starting with behaviour analysis, several different fields of science put terrorism on the agenda so they could better understand it. The increasingly complex society could hereby benefit from the research as to better prevent extremisation and terror from taking place in the future.

Conclusion

The data presented points in the direction of social reinforcement in a social network as a complex system have a part in radicalising an individual despite structural holes. Most likely the structures of different reinforcers are interconnected in making of the structures. Breivik was in many ways not alone during his operational stages of planning and training the terrorist attack on July 22nd, 2011, and yet he did so without signalling his plans. However, he was a lone actor in the sense of executing the attack, as far as we know about his connections in his 'dark networks'. This thesis did not find any signs of signalling behaviour in Breivik's case and is contradictory to other earlier studies of other terrorists. Therefore, more data is needed to draw any firm conclusion about what the shaping of this behaviour is caused by, but this is a start.

As for the research question: What role does social reinforcement have in radicalising an individual to commit terrorism? Breivik received potent social reinforcement as well as aversives in his network, as the relational ties between nodes and the structural holes between others mitigated and enforced certain political views, and or behaviours in this network as a complex system. The perpetrator had contact with nodes separately, as not sharing the social capital of the network resources. By doing so, the degree of entropy was decreased and the constrain the network had over Breivik was low so that he better could move unnoticed with planning, training and executing the attack. As such, it is the whole network as a complex system that enabled the terrorist behaviour and can therefore be understood as an emergent property of the system.

As today's society consist of increasingly more complex systems than before, behaviour analysis and other sciences must look to the field of extremism and terrorism and contribute to the understanding of the underlying mechanics of terrorist behaviour. As such, complexity theory is cross-disciplinary if future research in different sciences utilises the same framework of complexity (Domenico et al., 2019).

To do this is to be working towards the goal of consilience coined by Wilson (1998), that sciences possibly could bridge each other and understand their peers field and expertise, as to better understand and prevent terrorism in the future.

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Appendix:

Notification form for processing personal information

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Network Analysis of Lone Actor Terrorists: The Role of Social Reinforcement

Referansenummer

574422

Register

07.12.2020 av Rollef Eirik Løvås - s341258@oslomet.no

Behandlingsansvarlig institusjon

OsloMet – storbyuniversitetet / Fakultet for helsevitenskap / Institutt for atferdsvitenskap

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

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Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Rollef Eirik Løvås, s341258@oslomet.no, tlf: 90208019

Prosjektperiode

07.12.2020 - 30.07.2021

Status

08.12.2020 - Vurdert anonym

Vurdering (1)

08.12.2020 - Vurdert anonym

Det er vår vurdering at det ikke skal behandles direkte eller indirekte opplysninger som kan identifisere enkeltpersoner i dette prosjektet, så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 08.12.2020 med vedlegg, samt i dialog mellom innmelder og NSD. Prosjektet trenger derfor ikke en vurdering fra NSD.

Hva må du gjøre dersom du likevel skal behandle personopplysninger?

Dersom prosjektopplegget endres og det likevel blir aktuelt å behandle personopplysninger må du melde dette til NSD ved å oppdatere meldeskjemaet. Vent på svar før du setter i gang med behandlingen av personopplysninger.

10/06/2021 Meldeskjema for behandling av personopplysninger

https://meldeskjema.nsd.no/vurdering/5fccd2c6-32d9-4048-96d1-ef2b6b233a2a 2/2

VI AVSLUTTER OPPFØLGING AV PROSJEKTET

Siden prosjektet ikke behandler personopplysninger avslutter vi all videre oppfølging.

Lykke til med prosjektet!

Kontaktperson hos NSD: Jørgen Wincentsen

Tlf. Personverntjenester: 55 58 21 17 (tast 1)