

# 1. Wars, information and media morality

## 1.1. Introduction

Why do groups who have lived together for hundreds of years, suddenly turn on each other? Why does the media play such an important role in creating stereotypes about the "enemy" and often seems to be the primary way in which groups are turned against each other? Put more generally, where does the manipulative power of the media come from? The answer in this paper is simple: individuals basing their decisions partly on information obtained by media will give some credibility to whatever they hear from the media because they find it in their interest in general to do so. The idea is that media gives information on  $K$  aspects of life, while the media itself is only interested in 1 area of life: the utility of the person(s) controlling the media only depends on one factor. Because the media can be trusted to give correct information on the  $K-1$  other aspects of life, individuals will assign a positive probability to everything the media claims. If a fraction of individuals do not know with certainty what the interest of the media is, all the information given by the media will have effect.

The assumption that the media is always taken seriously by some comes from the observation that it may be costly to find out what interests the media: it takes time and effort to find out what the incentives of the media are. Not everyone is prepared to spend that time and effort: in the real world not all individuals have an IQ of 200. This leads me to make a distinction between persons who have zero transaction costs of obtaining additional information, who are called "clever", and individuals who have high transaction costs of obtaining additional information and are called "dumb". I think that we should not ignore this by assuming that each person is perfectly rational, but allow for the fact that some human minds are more limited than others and look at what happens when some individuals are "dumb", whilst others are perfectly rational.

I will therefore construct a game in which some individuals are not super-rational, in the sense that they do not take account of the fact that others might view the world differently from them. As we will see, the actions of the "clever" persons are partly dictated by the actions of the "dumb" persons. The basic game is a destruction game: two groups of individuals have the chance to kill each other or not. If one group plays kill and the other doesn't, the group that doesn't kill is killed and the group that killed is left with a guilty conscience. If both groups play kill, one group will survive. There are two stable equilibria: either both groups play kill or both groups play no kill. We name the equilibrium in which both

groups play kill a war.

An unexpected outcome was that two media firms do not necessarily make a war less likely than a single media provider who is interested in a war. Put simply, whatever the second media provider predicts will happen, will happen. This is where the media morality comes in: the second media provider will in most circumstances be able to determine whether a war will happen or not. A second media provider that is itself very incredible will predict a war if it wants to obtain credibility: it will recognise that the first media provider wants a war and will know that it (the second media provider) is less likely to make a wrong prediction if it also predicts a war than if it doesn't.

## 1.2. the basic game with a monopolist media.

Suppose we have four persons. Person 1 and person 2 share a recognisable characteristic (A). Person 1 is clever in the sense that his knowledge of what interests other individuals and the media is perfect. Person 2 is not clever and does not know with certainty what the interest of the media is. Person 3 and person 4 share a different recognisable characteristic (B). Person 3 is clever and person 4 is not.

The clever persons count for one, whilst the dumb persons counts for b. It will become clear later on that the weight b can be interpreted either as the relative number of dumb persons in this game, or as the relative effect of the actions of dumb persons (their power if you like).

All four persons have the same utility function and are aware that all the others have the same utility function:

$$U_i = \sum_{j=1}^{K-1} x_{ij}a_j + A(x_{iK})$$

where  $x_{ij}$  is the action person i takes on sphere of life activity j.  $a_j$  is the actual state of sphere of life j.  $x_{ij} \in \{0, 1\}$  and  $a_j \in \{-1, 1\}$ . In other words, depending on the actual state  $a_j$ , the individual has to choose the optimal  $x_{ij}$ . It is therefore in the interest of each individual to find out the actual state of sphere of life j. The K'th sphere of life denotes a destruction game, in which the pay-off are defined for both members of each type:

		Type A		
		do nothing	kill	
Type B	do nothing	0,0	-m,-L	L>2m>0
	kill	-L,-m	-(L+m)/2,-(L+m)/2	

the left-bottom pay-off shows that if both persons of type A choose 0 (do nothing) and both persons of type B choose 1 (kill), each type A player receives -L and each type B player receives -m. Killing therefore carries a cost, which is smaller than the cost of being killed. If one type A person chooses action 0 whereas the other type A person chooses a different equilibrium, both type A persons receive the average pay-off of the pay-off of the individual actions (as do persons B). Similarly, if both type A persons choose a different action, and the two type B persons choose a different action, each player receives the average of the four strategies. As an example, suppose player 1 chooses 0, player 2 chooses 1, and player 3 and 4 choose 1. Then player 1 and two receive  $\frac{-(3L+m)}{4}$ , whilst player 3 and 4 obtain  $\frac{-m-2bm-L}{2(1+b)}$ . The initial equilibrium is do nothing, do nothing.

The only source of information for all four individuals is a media-monopolist. The actual utility function of the monopolist only depends on the action in the K'th sphere of life and on its reputation<sup>1</sup>. For example, the media-monopolist wants to obtain the land of a tribe of Indians in a forest and needs all the Indians to be killed in a conflict so as to take over their land. Another example is when the media monopolist represents a politician of one of the two types whose position is threatened and whose only chance of maintaining power is a war between type A and B (for that would mean the politician from type B would be killed). The media monopolist is not interested in the other (K-1) spheres of life. The media monopolist does however have perfect information on all other (K-1) areas of life. Apart from this information, the monopolist is also able to give information on the intended action of all type B persons. The monopolist gives out information on each  $a_j$  and on the intended action of type B. The media monopolist therefore gives the correct values for  $a_j$  and has the option to give the prediction that all type persons choose "kill". All individuals know that if the media is interested in the K'th game, they will disinform the public.

The clever persons know everything, i.e. they know with a probability 1 that the area in which the monopolist is interested is the K'th area. Thus the clever persons disregard the information on the intended actions of type B.

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<sup>1</sup>The assumption that the monopolist cares about his reputation means that the monopolist has a (small) incentive to report the true state of nature. The importance of the K'th sphere of life however far outweighs the reputation concern.

The dumb persons are not completely sure about the interests of the media monopolist, and have a subjective probability distribution as to the area of life the media-monopolist is interested in:  $0 < p_j^o < 1$  and  $\sum_j p_j^o = 1$ . Dumb persons thus assign probability  $p_K^o$  to the possibility that the media monopolist is interested in the K'th sphere of life, in which case they will disregard the information on that sphere of life. The dumb persons also believe that the clever persons share the same probability distribution.<sup>2</sup> This means that in essence, the dumb person treats the K'th sphere of life just like all the other spheres of life: he form a subjective probability that persons of the other type will play kill and acts upon that subjective probability. Given that the dumb person expects all other individuals to form the same subjective probabilities on the basis of information given by the media, it is in fact a sustainable equilibrium for all dumb persons to do so themselves. Direct communication with persons of the other type are meaningless to the dumb person as he realises that they will have an incentive to claim they will not play kill, whatever their intended actions. The prior probability the dumb persons assigns to the possibility that the other type plays kill equals 0.

The strategy of the dumb persons on the other (K-1) areas of life is therefore simple: as long as  $p_j^o < 1/2$  they will choose the action that is optimal for when  $a_j$  is correctly given. The action of the dumb persons on the K'th sphere of life is what interests us however. First of all, we may calculate the probability  $\bar{p}$  at which person 2 will find it optimal to play "kill":

$$\begin{aligned}
 & E[\text{player 1 and 2 play 0} | \text{player 3 and 4 play kill with Probabillity } \bar{p}] \\
 = & -L\bar{p} \\
 & E[\text{player 1 and 2 play 1} | \text{player 3 and 4 play kill with Probabillity } \bar{p}] \\
 = & -m(1 - \bar{p}) + (-L - m)\bar{p}/2
 \end{aligned}$$

which means that player 2 will play kill if

$$\bar{p} > \frac{2m}{L + m}$$

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<sup>2</sup>If we would assume they could perfectly observe the actions and intentions of clever persons, the optimal strategy of dumb persons would be to follow the lead of the clever persons. In order to get a more realistic and interesting outcome, I therefore assume that the "dumbness" of these individuals also manifests itself in an inability (or lack of time) to follow the clever individuals. They therefore take the probabilities they have themselves to be shared by others as well. An alternative interpretation of  $p_j^o$  is that it denotes the fraction of dumb people believing that the area of interest of the media-monopolist is j. A similar story would unfold.

this is the threshold-value for the prior probability person 2 assigns to the action "kill" on the part of person 3 and 4. If this threshold value is reached, the resulting action by person 2 is kill. Now consider the strategies of the other players. Player 4, who interprets the media-given information on this game as information on the prior probability that person 3 plays kill and assumes person 1 and 2 both use this probability, will also play kill. Given the knowledge of these optimal reactions, player 1 and 3 play the following game if the threshold value of  $\bar{p}$  is reached:

		Person 3	
		do nothing	kill
Person 1	do nothing	$\frac{-3bL-3bm}{2(1+b)}$ , $\frac{-3bL-3bm}{2(1+b)}$	$\frac{-bL-bm-2m}{2(1+b)}$ , $\frac{-3L-m}{4}$
	kill	$\frac{-3L-m}{4}$ , $\frac{-bL-bm-2m}{2(1+b)}$	$\frac{-(L+m)}{2}$ , $\frac{-(L+m)}{2}$

which means that the option kill-kill is the only equilibrium if there holds

$$\frac{3bL + 3bm}{2(1 + b)} > \frac{bL + bm + 2m}{2(1 + b)}$$

which can be simplified so that there should hold

$$b > \frac{m}{L + m} \tag{1.1}$$

This condition specifies that if the relative number of dumb persons (or their effect on outcomes) is above a certain level, then the clever persons will play kill if they expect the dumb persons to do so. This means that a country or a region for which this model holds can be manipulated into a total war by the media if the fraction of dumb persons is big enough. If the fraction of dumb persons is not great enough, the clever persons can stop an all-out war irrespective of the actions of the media.

We proceed on the assumption that  $b$  is larger than the level required by condition (1.1): if  $b$  was not larger, then the media firm, who is only interested in creating a situation in which everyone plays kill, will realise that it cannot induce a war and will not predict a war so as not to lose reputation.

Now, how is this  $\bar{p}$  formed? With probability  $p_K^o$ , person 2 believes the media monopolist to be interested in area  $K$  and will expect the media-monopolist to give disinformation about the intentions of the other group. In that case, person 2 will trust his prior, namely the belief that the other group will play do nothing. With probability  $(1-p_K^o)$ , person 2 however believes the media-monopolist to have no interest in disinformation and will think the media tells him the truth about

the intentions of the other group. Then person 2 will trust the prediction given by the media. The subjective probability that the dumb person attaches to the probability that the media firm is interested in the  $K$ 'th area of life therefore determines how likely that dumb person thinks that the possibility is that that the other group plays kill if the media claims this. As noted before, if the dumb person uses this rule to arrive at an intended course of action, then it is optimal in expectation for the dumb person in the other group (B) to think that all group A persons will use this rule, which in turn makes it optimal for person 2 of group A to actually use this rule. It is therefore a self-enforcing equilibrium to use such a rule.

The situation "kill-kill" will thus arise when

$$(1 - p_K^o) > \frac{2m}{L + m}$$

We may note that if the media firm is aware of its credibility on the  $K$ 'th sphere of life, it will only disinform if the condition above holds. If not, it's prediction that the other group will play kill is ignored, whilst the media firm loses reputation and it's utility function is revealed. This condition therefore determines the actions of the media monopolist as well. If the condition above holds, the prediction of the monopolist that all type B individuals will play kill comes true and it suffers no damage to reputation, nor is it's utility function revealed.

### 1.3. Two media firms

The considerations above depends crucially on two things: a) there are enough dumb persons around to force the clever persons into a kill-kill outcome; b) the media firm is a monopolist who is actually interested in the actions taken on the  $K$ 'th sphere of life.

To relax the second assumption, we look at what happens when there are two media firms, of which the first is interested in the  $K$ 'th sphere of life and the second in the  $(K-1)$  sphere of life. We will again focus only on what happens in the  $K$ 'th sphere of life.

The probability that dumb persons attached to the possibility that the utility function of the first media provider depends on the  $K$ 'th sphere of life is again denoted by  $p_K^o$ . The probability assigned to the possibility that the utility function of the second media provider depends on the  $K$ 'th sphere of life is denoted by  $p_K^t$ . Consider the dependence of the actions of the dumb persons and hence of all persons, on the information given by the two media firms. Suppose the second media

provider reports that no killing will take place, whilst the first media provider nevertheless predicts a war. Then only if  $p_K^t(1-p_K^o) > \bar{p}$  will the dumb person play kill, for only then does he think it likely enough that the second media provider cannot be trusted, whilst the first can be trusted on the K'th area of life.

Now suppose that both media firms predict a war. Then if  $(1-p_K^t p_K^o) > \bar{p}$ , will the dumb persons play kill and will the prediction come true. The result is that for many values of  $p_K^t$  and  $p_K^o$ , the prediction given by the second provider on whether individuals will play kill or not, will become true. This leaves the second media provider with a moral dilemma: whatever it predicts will come true. Without an incentive to report that individuals will not play kill therefore, a second media provider does not necessarily make it less likely that individuals will play kill. Indeed, if the second media provider thrives on coverage of killing, it may well have an incentive to predict killings.

It is even possible that a second media firm which is solely interested in predicting accurately what will happen, makes it more likely that a war will brake out. This possibility arises if the second media firm is unsure about the credibility of the first media provider, e.g. does not know  $p_K^o$ . In that case the second media provider has a subjective probability distribution about  $p_K^o$ , denoted by  $f^t(\bar{p}_K^o)$ .  $F^t(\bar{p}_K^o)$  would then denote how likely the second media firm thinks that the probability that dumb persons assign to the possibility that the first media provider is interested in the K'th area of life, is below  $\bar{p}_K^o$ . We can now look at the probabilities that the prediction given by the second media provider is wrong, given its credibility and the expectations it has about the credibility of the first media provider. For what values of  $p_K^o$  will the second provider be wrong if it predicts no war whilst the first media provider does predict a war? Then there has to hold:

$$\frac{p_K^t - \bar{p}}{p_K^t} > p_K^o \quad (1.2)$$

When will the second provider be wrong if it predicts a war will take place when the first media provider also predicts a war? Then there has to hold

$$\frac{1 - \bar{p}}{p_K^t} < p_K^o \quad (1.3)$$

We can now see that the second media provider will choose to report that there will be a war if the first probability is greater than the second: the second media provider will predict a war if it believes the first media firm will do so and

$F^t\left(\frac{1-\bar{p}}{p_K^t}\right) > 1 - F^t\left(\frac{p_K^t - \bar{p}}{p_K^t}\right)$ . Given that the first media firm is aware of this dilemma, it will use this condition to decide whether to predict a war or not.

This means that if the second media provider thinks it very likely that the credibility of the first media is very great (low  $p_K^o$ ), then even if the second media provider also has a very high credibility (low  $p_K^t$ ), it will predict a war. If on the other hand the credibility of the second media provider in the K'th area is very low, denoted as a high  $p_K^t$ , a second media provider solely interested in obtaining credibility will find it in its best interest to claim that there will be a war if the first media provider does so. In turn, a first media provider who is aware of this dilemma, will declare that a war is going to take place sooner with an incredible second media provider than without one: the presence of an incredible second media provider therefore can be inducive to starting a war.

There is a second crucial point to be made here: for most values of  $p_K^t$ , the prediction of the second media provider will always come true independent of the credibility of the first media provider or of the prediction of the first media provider. The result is that the presence of a very credible second media provider who considers it a moral obligation to prevent war, will be able to prevent a war. If the second media firm feels it has a moral obligation to prevent wars, it will predict that no war will take place and the first media provider, knowing the motives of the second media firm, will then also not predict a war.

#### 1.4. Scarcity and conflict

Many social scientists (e.g. North and Thomas, Harris, Cohen, etc.) believe that conflicts are ultimately determined by the scarcity of production factors: wars are often explained as arising out of a conflict over the control of scarce resources such as water, land, women, etc. There is a very easy way to incorporate that possibility in this model: as the population pressure on scarce resources increases, the outside option (do nothing, do nothing) becomes less profitable and the option to kill becomes less costly. Put more simply,  $m$  goes down as the population pressure increases. As  $m$  goes down there are three effects: firstly the credibility of the media on the K'th sphere of life can be smaller for it to start the killing equilibrium. Secondly, the fraction of dumb persons required in order to trigger an all-out war goes down. Thirdly, as  $m$  goes down it eventually becomes negative, at which point the no-kill-no-kill option is not an equilibrium in the first place. Therefore, the media in this model ensures that a war over scarce resources happens before it is inevitable that it will happen anyway, e.g. would happen without media and



with perfect information.