Agency in Legal Reasoning

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Abstract. Agency is a key component in a trial. Various aspects thereof are distinguished: *mere causation* in contradistinction to two kinds of action, *instrumental*- and *purposive actions*. The *goal directed will* is also taken into account. The model for legal reasoning is based on an interrogative model of truth seeking for sciences, developed by Jaakko Hintikka. The attempt is to build in agency to this model of questioning as a part of a wider project aiming at the development of a model for legal argumentation.

1 Introduction

This work falls into the framework of the "Fenno-Scandic school" of action logic in combination with legal philosophy then branching to Jaakko Hintikka's work on logic and argumentation. Central in this group was Stig Kanger of Uppsala University. (See eg [13], [14], [15], [16], [17].) Well known in the community of legal philosophers is also Lars Lindahl from Lund University (See [18].). From Finland Ingmar Pörn and me myself may be seen as members of this same school. (See e.g. [19], [20].). Although founding this tradition of action theory, Kanger stayed with a Do-operator which mainly was a two place relation. Only in his last few papers in this area did he include the idea of a three place operator, still remaining though with an unanalyzed 'Do-concept'. Lindahl as well, in developing a deontic model including actions, in his remarkable book [18] stays with the unanalyzed two place 'Do-operator'. This holds for Pörn as well [19], [20]. Further developments of my own contributions to the field, in addition to my book, [5], can be found in [7] and [9].

In this paper I concentrate on legal reasoning as (it should be) performed in courts. In so doing I acknowledge that actions and agency play a significant role in the evaluation of agents. A brief presentation of the basic features in the action theory created in my book, *Action Purpose and Will: A Formal Theory* is thus in order. The concepts and their logical connections will then be used utilizing a variant of the model of truth seeking in science, the Interrogative Model, developed by Jaakko Hintikka, [2], [3], [4]. Into a modified version of this model I shall build my own Action Theory, [5].

In evaluating, criticizing and judging people we often have their actions and intentions in mind. They are what our judgments are all about. Fundamental distinctions to be made, however, are on the one hand between *mere causation* and *action*. The latter in turn divides into *instrumental action* and *purposive action*. Not being intentional, mere causation, or just causing, is *not* an action in any respect. One additional component to be taken into account is the will; *goal directed will* I name it. In the model of legal argumentation, of which this paper is a part, I suggest a method to be used in court of law by judges and jury members. This

Ghita Holmström-Hintikka, 'Agency in Legal Reasoning' in D. Bourcier (ed.), *Legal Knowledge and Information Systems. Jurix 2003: The Sixteenth Annual Conference*. Amsterdam: IOS Press, 2003, pp. 31-40.

model is based on questions and answers and consequences of them. The underlying model is the said Interrogative Model.

In court of law, whether it is a matter of criminal law or law of torts, the judge has to argue from given evidence to a right conclusion. The verdict and possible penalty will be dependent on his skills. If a jury is involved the same holds for it, from given testimonies, facts found e.g. in analyses at the crime lab etc. its task is to reach the right conclusion.

2 Causing, Acting and Willing

2.1 Conceptual Framework

Before continuing our discussion we need to fix our terminology. First, when we talk about *agents* we have in mind individuals such as persons, computer aided robots, God or collectives such as associations, business companies, societies. Agents may be involved in at least agent causation and willing. Agent causation may be purposive, i.e., intentional, as in *actions* or not on purpose, unintentional, as in *mere causation*. Being un-purposive mere causation or simply *causing* shall not be considered an action at all. Actions in turn fall into *instrumental action* and *purposive action.* Both categories have an element of purpose imbedded into them. To move sand in ones shoes constitute an example of mere causation. An additional component to be considered is the *goal directed will.* These concepts were created and discussed in depth in my book, [5] and can be presented only briefly here.

In what follows I shall use the following notation:

a, b, c, ..., x, y, z	as constants and variables for agents
m, n, p, q, r, ...	as variables for conditions (states of affairs)
'$\sim$', '$\vee$', '&', '$\rightarrow$', '$\leftrightarrow$'	are the usual Boolean operators for negation disjunction, conjunction, (material) implication, (material) equivalence
'$\exists$' and '$\forall$'	are the usual existential and universal operators
C, E, A, W	are used as operators for *mere* causation, *instrumental* action, *purposive* action and *goal directed will*, respectively. They operate over individuals as well as over conditions

2.2 Definitions and Bridging Principles

Using these tools we can construct the following three-place and two-place relations:

1. *Mere causation*, C(x,m,r), for agent x the means m suffices to obtain the result r (to appear, remain, disappear).

2. *Instrumental action*, E(x,m,r), by means of m the agent x sees to it that the result r obtains (appears, remains, disappears).

3. *Purposive action*, A(x,r,p), the agent x sees to it that r obtains (remains, ...), for the purpose that p.

4. *Goal directed will*, W(x,p,q), the agent x wills that p for the further goal that q (i.e., aiming that q).

In an un-analyzed form in everyday language we seem to use the shorter two-place relations for ‘causing’, ‘seeing to it’, ‘seeing to it on purpose’, ‘have a purpose’ and ‘to will’. They can and should, however, be analyzed by means of quantifiers in terms of the corresponding three-place relations. For instance ‘x causes it that r’ means that ‘some means m suffices for x to cause it that r’. In an analogous way quantifiers are used to quantify into contexts governed by the operators E, A, W:

(1.1)	C(x,r) $=_{df}$ mC(x,m,r)
(2.1)	E(x,r) $=_{df}$ mE(x,m,r)
(2.1.1)	x sees to it that r, iff x sees to it that r by some means
(3.1.1)	AN(x,r) $=_{df}$ pA(x,r,p)
(3.1.1.1)	x sees to it that r on purpose iff there is some purpose for which x sees to it that r
(3.1.2)	NA(x,p) $=_{df}$ $\exists$rA(x,r,p)
(3.1.2.1)	x has the purpose that p iff x does *something* for the purpose that p
(4.1)	W(x,p) $=_{df}$ $\exists$qW(x,p,q)
(4.1.1)	x wills that p iff there is some further goal q such that x wills that p for the further goal that q (aiming at q)

Note that AN(x,r) stands for ‘x sees to it that r on purpose’ and NA(x,p) ‘x has the purpose that p’.

The concept of ‘will’ I use as a technical term and have accepted Harry Frankfurt’s thought ([1], pp. 7 ff.) that

> [an agent’s] will is the notion of an effective desire - one that moves (or will or would move) a person all the way to action. (*Ibid.*, p. 8.)

The will thus described I name *goal directed* will and consider it a three-place relation between an agent x, the object p and the aim, i.e., further goal q as stated in the formula (4.1). This relation, as a matter of fact, forms the connection between will and purpose as postulated in the important *bridging principle* (AxWA):

(AxWA)	$\exists$qW(x,p,q) $\leftrightarrow$ $\exists$rA(x,r,p)
(AxWA.1)	x wills that p aiming that some q (for some further goal that q) iff x sees to it that some r for the purpose that p

In other words x wills that p, which is the object of his will, iff he does *something*, not necessarily p, for the purpose of fulfilling his will, i.e., for the purpose that p.

In analogy with the axiom above there are axioms which form the *bridging* principles between instrumental actions and purposive actions:

(AxEA)	$\exists$mE(x,m,r) $\leftrightarrow$ $\exists$pA(x,r,p)
(AxEA.1)	x sees to it that r by some means iff x sees to it that r for some purpose that p

In other words x sees to it that r iff x sees to it that r on purpose. From here and the definitions (2.1) and (3.1.1) we conclude that

(EA.2)	E(x,r) $\leftrightarrow$ AN(x,r)

Further bridging principles are presented in my book [5].

All the relations mentioned above are supposed also to be conditions. This observation becomes meaningful as we move to iterated and higher order relations, the agent sees to it

that she sees to it, sees to it that he wills, wills that he sees to it etc. When m,n,p,q,r,... are conditions in themselves, we can substitute for each of them another condition, even a three-place or two-place relation of acting and willing. Thus, we can express the judge's will in relation to the defendant:

W(d,W(x,r,s),q),
the judge (d) wills, aiming at punishing the defendant (q), that the defendant (x) wills that he becomes a better person (r) for the further goal that he ceases to commit crimes (s).

3 Argumentation and the Interrogative Model

A child crossed a lively trafficked street along the pedestrian's path towards green light. A private driver comes speeding along the street into the crossing against red light. The child is hit by the car and killed. This tragic example from real life may function as our model example.

The newspapers write about it, people ask about it, the authorities wonder. The case proceeds and becomes a typical legal case where by means of factual argumentation justice is sought for the parties involved.

Wonder is the first step towards truth seeking. When we wonder we start asking questions such as "Who drove the car?", "What was his speed?", "Did the girl walk towards red light?", "What is the speed limit for the street H?", "Was the driver under the influence?", "Was there a sight constraint?"

The model I shall present here has its roots in Hintikka's *interrogative* model for truth seeking in scientific theory and argumentation. The model has been further developed by several philosophers in Finland (Sandu, Hiipakka, Sintonen, Mutanen, Halonen) and in the United States (Bachman), to mention a few. My own work is calculated to develop this model towards legal philosophy, especially legal argumentation.

Initially the model assumes true answers but by means of a bracketing procedure one can scrutinize false answers and their consequences. Unfortunately I have no space here to explain the bracketing procedure, as important as it is in legal contexts including the hearing of witnesses. (For a further presentation, see. [3]. See also [10].)

Following Hintikka we shall envisage a game theoretical model where the actors are the *Inquirer* and the answerers, the *Oracle* or *Nature*. The task as an Inquirer may be divided among several agents, a fact which becomes plain for instance in a trial where the prosecutor and the defense lawyer share the task of finding the truth. *Oracles* in a trial may be the witnesses, w_1, ... or expert witnesses, ew_1,... the police in the street, the forensic laboratory ...

The method is a book keeping method where the questions by Inquirer to the Oracle are written in a Beth type table. In an American court room this task is taken care of by the trial secretary. The answers, the true answers are written in the left column of the table. In the right column the ultimate conclusion C_U and possible falsity preserving statements are written down. The initial premises, IP, e.g. Betty was hit by the red car, and new premises P_1,P_2,... e.g. Betty was killed, the breaking distance was m meters, as well as logical inferences, LI, sometimes also named conclusions, C, made from them, all come on the left hand side. Questions and answers bring in *new information* to the reasoning, i.e., argumentation and they are called *interrogative moves*, IM. When this new information or inferences drawn there from is of *legal* nature we shall talk about *legal moves*, LM. The interrogative model is obviously a dialectic method with its roots in Socrates. The modern variant covers almost

Table 1:

1.	If a driver drives faster than 80 km/h then he is speeding
2.	This driver drove with the speed of 100 km/h
3.	This driver was speeding

Table 2:

		T	C
1.	If the driver drives faster than 80 km/h then he is speeding	(IM)	C_U
2.	This driver drove with the speed of 100 km/h	(IM, or: w1)	
3.	100 km/h is faster than 80 km/h	(tacit)	
4.	This driver was speeding	(LI, 1, 2, 3)	
5.	The one who is speeding shall be punished with fines	(LM, or: ew)	
6.	This driver shall be punished with fines	(LI, 4, 5)	

all logical models but myself I have applied and developed it in the field of legal reasoning. Thus, the talk about legal moves constitutes an addition to Hintikka's model. So does the introduction of action logic.

Table 1. gives a good picture of the model in its simple form. A single argument consists of one or more premises and a logical inference based on the laws of logic.

This syllogism turned into the interrogative table gives us by far more information when at each move we also spell out the Oracle. Notice also that the tacit knowledge has to be spelled out as in 3 in table 2.

4 Questions about Questions

4.1 Definition

Questions may be defined as the Inquirer's request to the Oracle. "See to it that I know *whether* (or *that*) . . . " (Cf [2], p. 22 f.) For instance when the Counselor asks "What happened in the intersection?" she d*e facto* expects to be informed (get to know) that the red car drove through red lights.

In the interrogative method we distinguish two kinds of questions, "big" *main* questions and "small" *operative* questions which are needed to help to solve the problem. When a big question i.e., a principal question has gotten its final solution it can later function as an operative question in a new argument. In the case law system this is a familiar procedure, for instance cases which get their final solution in the Supreme Court function as precedents in future similar cases in lower courts.

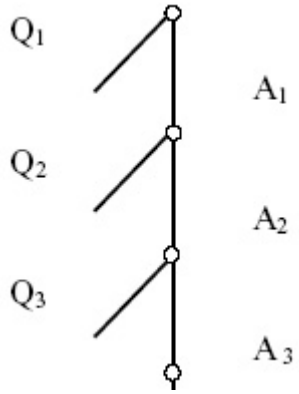
We also make a distinction between 'yes-no questions' and 'Wh-questions' in both "principal" and "operative" questions. The 'Wh-questions' are "what?", "who?", "which?", "why?" and "how?". The "yes-no questions" result in a branching tree, the answers to the "wh-questions" bring in new information. It is permitted to ask a question only if the *presuppositions* have been established. For instance "When did you give your husband a flower?" is permitted only if the answerer has a husband. The answers on the "yes-no questions" establish which one of two possible branches is the right one.

I have, as I said, developed Hintikka's model in three respects and keep applying it into legal matters. 1) I have introduced the legal moves (LM) and everything that follows, in the category of questions and answers in the legal field. For instance "the one who breaks the law shall be punished", 2) the Socratic tree as a model of Socratic dialectic, 3) the introduction of action logic developed by myself.

4.2 Socratic Dialectics

'Hostile witness' is a concept familiar to us through American court movies. A hostile witness is usually the opponent's witness who is likely to be unwilling to cooperate and to share information. The method of cross-examination is used, 'yes-no questions' are asked. "Answer the question 'yes or no'!"

In my view the Socratic dialectic either-or method may be represented by a branching tree. Even the modern scientific and legal investigation has its roots in the Socratic dialectics. When the learned man asks his questions they would be in the form of "When somebody helps, should we say that . . . or is it . . . ?" We can see him build the interrogative tree where in each node there are two branches. The given answer is added to the existing positive branch and will form the foundation for a new question. Since this was presented in earlier papers of mine, I shall not go further into it here. (See, e.g., [10].)



5 Actions in the Interrogative Model

We are now entitled to ask how our action concepts fit into the interrogative model and then we shall think in particular of the legal expansion thereof.

Let us assume that the case reaches the court of law. For the sake of the continued process (and for the sake of the title of the crime), it is important that we analyze the agent causation somewhat closer. We assume two agents, 1) the driver $a$in the red car and 2) the girl Betty who was killed, b. Now we may ask what Betty did and we shall see that

(5.1.1) For Betty it sufficed to walk into the street (m_1) to be killed (r_1)

(5.1) C(b, m_1, r_1)

(5.2.1) By walking by the green lights (m_2) Betty made sure that she entered the intersection (r_2)

(5.2) E(b, m_2, r_2)

(5.3.1) Betty entered the intersection (r_2) for the purpose of reaching the other side (p_1)

(5.3) A(b, r_2, p_1)

(5.4.1) Betty willed that she reached the other side (p_1) for the further aim that she goes to her school (q_1)

(5.4) W(p_1, q_1)

In a similar way we may spell out the activities of the driver.

(5.5.1) For the driver speeding (m_3) suffices to kill the girl

(5.5) C(a, m_3, r_1)

(5.6.1) By speeding (m_3) the driver sees to it that he reaches the intersection (r_2)

(5.6) E(a, m_3, r_2)

(5.7.1) The driver sees to it that he reaches the intersection (fast) (r_2) for the purpose of proceeding fast (p_2)

(5.7) A(a, r_2, p_2)

(5.8.1) The driver wills that he proceeds fast (p_2) aiming at reaching his destination fast (q_2)

(5.8) W(a, p_2, q_2)

Now we can bring this section of the court protocol into the table form (Table 3). In Table 3 in our example we have one single straight path which bridges to the ultimate conclusion. If we assume a split path as a consequence of a disjunction (or implication) there is the option that one of the paths either closes by contradiction or else remains open. The other obviously bridges to the ultimate conclusion on the right. An open path, as indicated in Table 4 line n+3, provides us with a counterexample. One simple example where we obtain a split path is the possibility expressed as an answer to a question: "The driver either caused it that Betty is dead, C(a, m_4, r_1), *or* he saw to it that she is dead by speeding, E(a, m_3, r_1). In pursuing these two paths we proceed as before, but now we have to apply these rules to two separate paths. Let us assume for instance that this happens in our table on line n, see Table 4.

The bracketing method enables handling of contradictory situations should they occur at any stage in our argument. We proceed backwards along the table and using the interrogative method, inquire each step in the argument. If and when we find the weak spot, the lie or even a mistakenly adopted theory, we bracket this answer and every further step in which it plays a role. (For further discussion see e.g., [3], [8], [10].) Different ways of dealing with new information which may then and otherwise occur, is that it always can be construed as answers to questions.

One additional observation we want to make is the following: As a consequence of our action analyses we can distinguish, not only the actions but also the questions to which the separate agency concepts give an answer. Mere causation answers questions about

"who?" and "what?" and "how possible?"; "who caused what?" and "what made it possible?". Instrumental action in turn answers questions about "who?", "how?" and "what?" In addition to answering the "who?" and "what?" questions purposive action also gives an answer to "why?". Finally, the will concept is capable of giving an answer also to "what for?", in addition obviously to "who?", "what?" and "why?"

A final note, but an important one needs to be made. We have shown that this driver was reckless but we have not shown that he killed the girl on purpose. In other words he did not

Table 3:

		T	C
1.	Betty is dead	IP	
2.	C(b, m_1, r_1)	P_1 (IM)	C_U
	For Betty it sufficed to walk into the street (m_1) to be killed (r_1)		
3.	C(b, r_1)	(LI, 2)	
4.	m_1 & r_1	(LI, 2, 3)	
5.	C(a, m_4, r_1)	P_2 (IM)	
	For the driver driving towards red lights (m_4) suffices to kill Betty (r_1)		
6.	C(a, r_1)	(LI, 5)	
	The driver caused it that the girl is killed (r_1)		
7.	m_4 & r_1	(LI, 5)	
8.	E(a, m_3, r_4)	P_3 (IM)	
.	By speeding (m_3) the driver sees to it that he hits the red lights (r_4)		
9.	m_3	(LI, 8)	
10.	r_4	(LI, 8)	
11.	The one who kills another person shall be punished	(LM)	
12.	The driver shall be punished	(LI, 6, 11)	
13.	A(a, r_4, p_2)	P_4 (IM)	
	The driver sees to it that he reaches the intersection fast (r_2) for the purpose of proceeding fast (p_2)		
14.	$\exists$pA(a, r_2)	(LI, 13)	
	the driver drove fast to the intersection on purpose		
15.	E(a, r_2)	(LI, 13)	
	the driver drove fast to the intersection		
16.	If somebody kills another person on purpose (with the purpose of killing) he shall be punished for murder	(LM)	
17.	a did not kill on purpose	P_5 (IM)	
18.	If somebody causes another person's death out of recklessness he shall be ...	(LM)	
19.	$\sim$E(a, A(a, r_2, p_2), r_5)	P_5 (IM)	
	By means of reaching the intersection fast (r_r) for the purpose of proceeding fast (p_2) the driver did *not* see to it that he was careful (r_5)		
20.	The driver shall be punished for causing Betty's death out of recklessness	(LI, 17, 19)	
		C_U	

Table 4:

n	E(a, m_3, r_1)	$\vee$	C(a, m_4, r_1)
n+1	E(a, m_3, r_1)		m_4
n+2	$\exists$pA(x, r_1, p)		r_1
n+3	open path		bridge to C_U

see to it that the girl was killed although he caused it.

6 Future Perspectives.

There has been a vast discussion about agents' intent. The charges against a defendant are often dependent on whether criminal intent, *mens rea*, a guilty mind, can be shown or not. How to argue about the defendant's possible *mens rea* is a matter for the two attorneys and a future paper and shall not be dealt with here.

References

[1] Harry G. Frankfurt, Freedom of the Will and the Concept of a Person. In: *The Journal of Philosophy*, **68.** No. 1, (1971), pp. 5-21.

[2] Jaakko Hintikka, *The Semantics of Questions and the Questions of Semantics*, (Acta Philosophica Fennica, **XXVIII**, No. 4), 1976. North-Holland Publishing Company, Amsterdam.

[3] J. Hintikka, and Bachman, J. *What If . . . ? Towards Excellence in Reasoning*, ISBN 0-87484-964-0, Mayfield Publishing Company, Mountain View, California, 1991.

[4] Jaakko Hintikka, *Inquiry as Inquiry: A Logic of Scientific Discovery*, ISBN 0-7923-5477-X, Kluwer Publishing Company, 1999.

[5] Ghita Holmström-Hintikka, *Action, Purpose and Will: A Formal Theory* ISBN 951-9264-12-4, (Acta Philosophica Fennica,.Vol. **50)**, Helsinki, 1991.

[6] Ghita Holmström-Hintikka, Evidence, Experts and Legal Reasoning. In: G. Holmström-Hintikka, (ed.) Legal Argumentation, *Communication and Cognition*, Vol **28**, No 1, 1995. pp. 7-36.

[7] Ghita Holmström-Hintikka, Actions in Action, In: G. Holmström-Hintikka and Tuomela, R., *Contemporary Action Theory, Vol I: Individual Action*, ISBN 0-7923-4752-8, Synthese Library Vol **266,** 1997, pp. 109-134**.**

[8] Ghita Holmström-Hintikka, Expert Witnesses in the Interrogative Model, *Computing and Informatics*, Vol. **20**, 2001, pp. 555-579.

[9] Ghita Holmström-Hintikka, Stig Kanger's Actions and Influence. In: [11],Vol. II, ISBN 1-40200111-8, Synthese Library, Vol. **304**, 2001, pp. 185-204.

[10] Ghita Holmström-Hintikka, Questions about Answers. In: T. Childers and Majer, O., (eds.), *The Logica Yearbook, 2002*, ISBN 80-7007-172-9 Filosofia, Prague, 2003, pp. 99-108.

[11] G Holmström-Hintikka, S. Lindström and Sliwinski, R., *Collected Papers of Stig Kanger with Essays on his Life and Work*, Vol. I and Vol. II, ISBN1-4020-0021-9 and ISBN 1-4020-0111-8, Kluwer Academic Publishers, 2001, Synthese Library, Vol**, 303**, **304**.

[12] Helle Kanger, *Human Rights and Their Realization*, Reports of the Research Project Models for Justice, Department of Philosophy, University of Uppsala,**1**, 1981.

[13] Stig Kanger, New Foundation for Ethical Theory, First published , Stockholm 1957, Reprinted in: R. Hilpinen (ed.) *Deaontic Logic: Introductory and Systematic Readings, Dordrecht (*Reidel, Synthese Library), 1971, pp. 36-58. Reprinted in [11], pp. 99-119.

[14] Stig Kanger, (together with Helle Kanger), Rights and Parliamentarism, In: R.E. Olson and Paul, A.M., (eds.), *Contemporary Philosophy in Scandinavia*, Baltimore (Johns Hopkins Press), 1972, pp. 213-236. Reprinted in [11], pp. 120-145.

[15] Stig Kanger, Law and Logic, *Theoria*, **38,** 1972, pp. 105-236. Reprinted in [11], pp. 146-169

[16] Stig Kanger, Some aspects on the Concept of Influence, In: *Filosofiska smulor tillägnade Konrad Marc-Wogau, 75 ar*, Uppsala, 1977, pp. 12-23. Reprinted in [11], pp. 170-178.

[17] Stig Kanger, On Realization of Human Rights , In: G Holmström-Hintikka and A.J.I. Jones (eds.), *Action, Logic and Social Theory. Dedicated to Ingmar Pörn on the Occasion of His* 50^{th} *Birthday*, Helsinki (Acta Philosophica Fennica, **38**) 1985, pp. 71-78. Reprinted in [11] pp. 179-191.

[18] Lars Lindahl, *Position and Change*, D..Reidel Publishing Company, 1977, ISBN90-277-0787, Synthese Library, Vol 112.

[19] Ingmar Pörn, *The Logic of Power*, Basil Blackwell, Oxford, 1970.

[20] Ingmar Pörn, *Action Theory an Social Sciences*, D. Reidel Publishing Company, Dordrecht, Holland/Boston, 1977.