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Variants of Incongruity Resolution

1. Introduction

For some centuries, various authors have argued that incongruity is centrally involved in humour. More recently (particularly within the last forty years) there has been much attention to the need, within humour, for the resolution of the incongruity. Although there are sometimes allusions to an »incongruity-resolution theory« of humour (Suls 1977, Rothbart/Pien 1977, Katz 1993, Martin 2007), there is no single definitive statement of such a theory. In this article, we re-examine the characteristics of both »incongruity« and »resolution«, and show how there are a number of versions of incongruity-resolution (IR) theory, differing systematically in how these two central terms are interpreted and related to each other. In Section 3 we will show how certain aspects of IR theory can vary, then in Section 4 we will sketch how some published proposals fit into this framework. The conclusion is that some of the different IR theories have very little in common, particularly in the meaning they assign to »resolution«, and the relation of »resolution« to »incongruity«.

2. Background

In normal parlance, »incongruity« is the property of »being incongruous«, and a standard dictionary definition of »incongruous« is:

1. incompatible with (what is suitable); inappropriate.
2. containing disparate or discordant elements or parts. (Makins 1979)

The idea that incongruity is central to humour can be traced back for centuries, and is well-established within modern humour research. The literature is full of discussion of incongruity by philosophers, psychologists, literary scholars and others (Morreall 1983, 1987, Forabosco 1992, Attardo 1994, Latta 1999).

For the kind of incongruity relevant to humour, there is still not a rigorously precise definition that would allow an experimenter to objectively determine whether or not incongruity was present in a given situation or stimulus. There

are a number of different concepts of incongruity in use within the literature on humour.

The idea that humour is created by incongruity that can be »resolved« (in some sense of being justified or made to seem appropriate) has less of a history. Some authors attribute this idea to Freud, on the basis of his allusion to »sense in nonsense« (Freud 1966, 35), although this remark refers to the need for a play on words to have some »deeper« meaning, so it is not clear that Freud was proposing »resolution« in the sense that modern authors use the term. Ruch (1992) attributes the ideas to von Schiller (1938), and Attardo (1997) credits Aubouin (1948) with having made useful proposals in this direction.

However, the modern emphasis on IR began in 1970, with two doctoral theses (Shultz 1970, Jones 1970), followed by several articles during the next decade or so (Suls 1972, Shultz 1972, Shultz/Scott 1974, Rothbart 1977, Rothbart/Pien 1977, Suls 1983). There was little development of the IR framework during the 1980s and early 1990s, but since its adoption in 1997 by the proponents of the »General Theory of Verbal Humour« (Section 4.4 below), there has been new consideration of these ideas.

To researchers who are interested in the use of humour within specific social or cultural contexts, or the relationship of humour to other factors such as brain injury or health, IR is sometimes assumed to be a known, unproblematic concept (Section 5 below). On the other hand, when research into the details of humour mechanisms is analysed, as here, it becomes clear that the nature of IR is still an open question, as we shall explain.

3. Aspects of IR Theories

As a first stage, we shall map out the territory by setting out some of the ways in which formulations of »IR theory« tend to differ. That is, there are a number of design choices which humour researchers make in devising a notion of IR, but these options are not usually explicitly stated. Here, we will abstract, from the various proposals in the literature, six distinctions which can usefully be made in describing an IR theory, which could loosely be labelled *scope*, *sequentiality*, *location of incongruity*, *routes to incongruity*, *facets of resolution* and *extent of resolution*. Of these, four (scope, sequentiality, location of incongruity, and extent of resolution) are ways in which IR proposals vary, whereas two (routes to incongruity and facets of resolution) are merely conceptual distinctions which should clarify discussion.

3.1 Scope

The term »the incongruity-resolution theory of humour« might suggest that the IR analysis offers an account of all forms of humour. In fact, not all authors subscribe to

this position – some merely claim that IR gives a good description of some subclass of humour (McGhee 1977, Suls 1983, Forabosco 1992, Ruch 1992).

If we want to see IR as a full scientific theory of the working of humour, then the question of scope has consequences for its status in terms of falsification. Ideally, a scientific hypothesis about some phenomenon (e. g. humour) should in principle be capable of being shown, by empirical evidence, to be false. For a proposed humour mechanism, falsification could be achieved by clear counterexamples: humour which does not use the mechanism. However, if IR applies only to a subclass of humour, then it is not *necessary* for all humour. Hence, an example of humour which can (somehow) be shown not to rely on the IR mechanism is not a counterexample, unless it falls inside the particular subclass for which IR has been proposed as an explanation. That can be decided only if the author(s) in question have given a clear definition, independent of IR, of the subclass to which IR applies; such definitions rarely occur in the literature.

A proposal that IR underlies only a subclass of instances of humour may well be putting the IR mechanism forward as *sufficient* for humour. That is, not all humour relies on IR, but where IR occurs there will be humour. In that case, a counterexample would be a stimulus (joke or cartoon) which involved IR but was in no way humorous. This may well be what many authors intend. Another, weaker, position is that IR is neither necessary nor sufficient for humour. That is, the claim could be that in some cases the humour is caused by IR, but sometimes IR does not cause humour. This would constitute a falsifiably predictive scientific conjecture only if the circumstances in which IR did or did not produce humour were fully specified (otherwise the position is uninterestingly vague). If the additional circumstances C required as a catalyst were to be specified in sufficient detail, then the theory would not state that IR is the cause of humour, but that IR together with C causes humour.

It may be that humour research is not yet at the stage where we can formulate precisely falsifiable predictions, and ideas (such as IR) are simply contributions to an ongoing informal discussion which we hope will eventually settle into firmer theoretical hypotheses. There is no problem with this, as long as IR is treated as having this more tentative status – a preliminary idea rather than a theory.

3.2 Sequentiality

The widespread informal idea of IR assumes some form of sequential perception. That is, the crucial factor is an ordered sequence of events, with the audience first perceiving the incongruity, then grasping the resolution: »[...]incongruity is only the first stage and resolution of the incongruity is necessary for eliciting humor responses.« (Suls 1977, 41). This process-oriented perspective is often seen as a »cognitive« theory of humour perception:

There is general agreement about the existence of this two-stage structure in the process of perceiving and understanding humour [...]. The common element in this type of humor is that the recipient first discovers an incongruity that is then fully resolvable upon consideration of information available elsewhere in the joke or cartoon. (Ruch 1992, 31).

However, a non-process-oriented variant of IR is not only logically possible, but has found support more recently – see Sections 4.3 and 4.4 below. In such a version, the humorous stimulus (text, picture, etc.) would contain both an incongruity and some means to resolve this, but these do not have to be recognised (by the audience) in that order; that is, the information necessary for resolution could be noticed before the actual incongruity. The original sequential view stresses the cognitive processing nature of the model, whereas the non-sequential perspective puts more emphasis on the content of the stimulus; see Latta (1999) for a discussion of »response-side« versus »stimulus-side« theories.

3.3 The Location of the Incongruity

Linguistic analyses of jokes and cartoons have demonstrated a certain amount of structure, both within humorous stimuli themselves and in the flow of cognitive processing by a perceiver. The next question is: where within this map of the stimulus (and its processing) does the incongruity occur? Although all notions of incongruity within the literature involve some »clash of concepts«, these are located in various positions with respect to the flow of processing. What follows here is not merely an arbitrary classification of abstract possibilities – various authors have put forward IR variants in which the locus of the incongruity is defined in these particular ways. The options can be broadly labelled in the following ways:

1. *Part of the conveyed scenario.* This where the joke or cartoon expresses some event(s) or situation or idea, and somewhere within that information there lies incongruity. No claim is made that this is related to the manner or order of the conveying of information, and so there is no dependence on a sequential scheme. The described circumstances simply violate some expectation of normality. The normality in question may be the usual practices of the audience's society, or may involve logic, or commonsense understanding of the physical world. Examples of this include (1) and (2). (It is hard to state definitely that any given example contains a particular variety of incongruity, as texts do not explicitly signal their structure, and the attribution of incongruity – of any kind – to a text is in the eye of the analyst.)

- (1) Nineteen-year-old Texan Roger Martinez set a world record by swallowing 225 live goldfish in 42 minutes in a San Antonio contest. His prize: a free fish dinner. (*Sun*, quoted in Parsons (1971))
- (2) Imagine if there were no hypothetical situations. (Carr/Greeves 2006)

This is to some extent the default position, being the least specific of the variants considered here. In a sense any author espousing »incongruity« as a crucial ingredient adopts this position unless specifying otherwise; see also the discussion of work by Shultz, Section 4.1.

2. *Related to the process or presentation.* The incongruity may not just be part of the overall picture conveyed, as above, but may centrally involve the actual discourse structure (or processing) of the text in some way. That is, it may be defined in terms of relationships between two semantic or discourse structures which are in turn defined as aspects of the way the humour is conveyed. Three such types of incongruity that have been suggested are these:

(a) *Set-up/punch-line conflict:* This form of incongruity depends on a mismatch between the information conveyed earlier in the presentation of the material (joke, cartoon, etc.) and that which is conveyed later. In a simple joke, this corresponds to the parts of the text usually referred to as the *setup* and the *punch-line*, but the essential characteristic is the sequential ordering of the receipt of the information by the audience, which also corresponds to the textual order of the material. (The mnemonic labels used here for classifying incongruity by location have no significance in themselves. They do not mean, for example, that only one type of incongruity involves »conflict«, in its normal sense.) The earlier information is internally consistent, without incongruity, and the later information is also not inherently incongruous. The incongruity arises because the two instalments of information are mutually incompatible. Suls offers (3) as an example of such inconsistency, and (4), (5) are probably similar in form.

- (3) O'Riley was on trial for armed robbery. The jury came out and announced, ›Not guilty‹. ›Wonderful‹, said O'Riley, ›does that mean I can keep the money?‹ (Suls 1972)
- (4) I'm very proud of this pocket watch. My grandfather, on his deathbed, sold me this watch. (Woody Allen, quoted in Carr/Greeves (2006))
- (5) I saw six men kicking and punching my mother-in-law. My wife said, ›Aren't you going to help?‹ I said, ›No. Six should be enough.‹ (Les Dawson, quoted in Carr/Greeves (2006))

This type of incongruity has a degree of asymmetry in it, in the sense that the early information and the later information do not play identical roles: the later information forces the audience to re-assess the earlier information. This location for the incongruity makes sense only in a sequential variant of IR (Section 3.2 above).

In addition to Suls (1972), Shultz/Scott (1974) can be seen as taking this position.

(b) *Incorrect prediction:* The early information within a stimulus may generate, in the mind of the audience, predictions about what will come next. If the subsequent information clashes with these predictions, then humour results. Shultz (1976, 12) gives this characterisation (which may be more his summary of other

authors, such as Kant): »Incongruity is usually defined as a conflict between what is expected and what actually occurs in the joke.«

Examples (6) and (7) seem to exemplify this pattern, in that the final word is in marked contrast to what might be expected.

(6) She who hesitates is won. (Oscar Wilde, quoted by Bentley/Esar (1962))

(7) One more drink and I'll be under the host. (Dorothy Parker)

Once again there is an asymmetry between the roles played by the different information. Although this is logically separate from »set-up/punch-line conflict«, the distinction is quite fine, and some authors seem to merge the two ideas. For example, Suls (ibid.) suggests that (3) involves a violated prediction. Also, it is hard to imagine an example of violated prediction which would not also constitute a conflict between punch-line and set-up information, although the converse is not so implausible: there could be conflict without there having been a precise prediction.

Again, this notion of incongruity is dependent upon a sequential analysis, as the prediction occurs over the time taken to process the stimulus.

(c) *Alternative interpretation contrast*: In this form of incongruity, the humour involves two distinct interpretations or viewpoints of the information supplied within the humorous stimulus, for example by means of linguistic ambiguity. The incongruity is then derived from the way in which these interpretations differ: there is a clash of perspectives. This form of incongruity is symmetrical, in that neither perspective is defined as having priority, with the incongruity arising from the mutual clash. Raskin (1985) analyses (8) as an example of script opposition, in which two structured events or objects are set against each other (see Section 4.4 below); here, a medical consultation versus a covert sexual liaison.

(8) »Is the doctor at home?« the patient asked in his bronchial whisper. »No«, the doctor's young and pretty wife whispered in reply. »Come right in«. (Raskin 1985)

There is an extremely common concept of joke interpretation, put forward by (amongst others) Heller (1974), Paulos (1980), Dascal (1985), Norrick (1986), Dolitsky (1992), which Ritchie (2004, ch. 5) discusses under the label *forced reinterpretation*. In this strongly sequential analysis, one interpretation of the joke's set-up is less obvious (to the audience) than another, so that only one reading is initially perceived. However, the punch-line forces the audience to reconsider and thereby find the second, initially less obvious, reading. Interestingly, the notions of »incongruity« (and »resolution«) are imposed upon this general scheme in different ways by different authors. Although some (e.g. Vaid et al. 2003) regard this outline, without further specification, as defining the notion of IR, some suggest that the incongruity within this scheme is what we have called »set-up/punch-line conflict«, some see the incongruity as being »incorrect prediction« and others locate the incongruity as »alternative interpretation contrast«.

These broad labels are intended to separate different ways in which incongruity shows up within the overall humour experience, not to explain the inner workings of each type of incongruity. The important point here is that different authors define incongruity in these different ways, allowing the logical possibility that a text could manifest one author's incongruity but not another's.

3.4 Routes to Incongruity

Some informal glosses of the idea of »resolution« depict it as something that leads, in some quasi-logical fashion, to the incongruity. For example, Suls (1977, 41) says that resolution can be »[a] reason for the appearance of the incongruous information«. This means that it can be easy to confuse three different semantic/logical paths leading to the incongruity. The first of these routes concerns how the incongruous situation differs from normality. Sometimes, the incongruity (particularly if it is what might informally be called »absurdity«) is produced by altering some normal, everyday state of affairs in some way. This transformation (from mundane to absurd) contributes to the incongruity, but it may not be explicit in the humour stimulus. Here we will use the term *deviation* (of the incongruity) to refer to such mappings. An example of this is *exaggeration* (one of Berger's 1998 catalogue of humour devices), which shows up in a joke such as (9).

(9) Yo mama's so fat, her ass has its own congressman. (Bergen/Binsted 2003)

It is not obvious that realising that this is an exaggeration »resolves« the incongruity in any real sense.

Yet another abstract notion, which is particularly relevant to pinning down the relationship between incongruity and resolution, is what we will call the *discovery* of the incongruity. This is the chain of associations or inferences which leads from the information explicitly presented in the joke/cartoon (which may not be explicitly incongruous) to the image or situation which is incongruous. This may not be applicable in all cases, but (10) could be viewed in this way.

(10) A reporter saw a crowd gathered around a road accident. Anxious to get a scoop, he told the bystanders: »Let me through, let me through! I'm the son of the victim.« The crowd made way for him. Lying in front of the car was a donkey. (Tibballs 2000, 228, No. 1718)

In this example, there is no inherent incongruity presented in the punch-line that has to be »explained«, since a donkey can quite naturally be involved in a road accident. Instead, some (immediate, unconscious) reasoning – the »discovery« – must be carried out before the humorous connection is made: if the victim is a donkey, the reporter has claimed to be the son of a donkey. This conclusion is presumably the humorous incongruity, if there is any. Whether any further resolution is then

possible is unclear. The fact that the reporter has said this in order to get through the crowd is already made clear in the set-up.

Neither the deviation nor the discovery are logically the same as the resolution, in the sense that they do not lessen or eliminate the incongruity; in the case of the »discovery«, this actually leads to the incongruity. However, these facets can be so prominent in the humorous text that a humour analyst may indicate these as being central to the humour, perhaps even constituting the resolution. For example, »exaggeration« is listed by Attardo et al. (2002) as a »logical mechanism«, and (as explained in Section 4.4 below), a logical mechanism is equivalent to a resolution. Also, Attardo (1997) proposes as the resolution (of the incongruity of two conjoined noun phrases), a rule which appears to be the »discovery« of the incongruity, rather than something that explains (resolves) the incongruity.

3.5 The Facets of Resolution

Turning from »incongruity« to »resolution«, there is again a need to distinguish certain conceptually separate concepts. Attardo (1997) makes the distinction between the resolution itself (which is a dynamic process), and the enabling mechanism, which is »a static component of the text«. This two-way classification is a useful step, but there is also the abstract bridge between textual content and the process of resolution, namely some rule or chain of reasoning (perhaps valid, perhaps faulty on logical or empirical grounds) which can be applied to the material in the text, this act of rule-application constituting the dynamic act of resolution. Here, we will adopt a three-way dissection: the Information Content (for the resolution) is the material, within the content conveyed by the text (or other representation), on which the resolution is based; the Cognitive Rule(s) (following Suls' terminology) are the pseudo-logical or quasi-empirical generalisation(s) which apply to the information content; and the Resolution Process consists of this application of rule(s) to content, an event. All of these are needed for resolution; that is, these are separate facets of resolution, not alternative kinds of resolution. However, the word »resolution« is sometimes used for one of these, sometimes for another, as can be seen in our discussions (below) of the work of Shultz and of Attardo. It is not clear whether these terminological variations are symptoms of real differences of substance about what constitutes resolution. Nevertheless, this more precise clarification can be useful in comparing certain proposals.

3.6 The Extent of Resolution

A central question which distinguishes different IR proposals is: does the resolution wholly remove the incongruity? Broadly, three degrees of resolution appear in discussions of IR, in various combinations:

Full: In this mechanism, the resolution provides sufficient explanation of the apparent incongruity that there is no longer any incongruity: all oddity is eliminated from the perceived situation. The resolution is a complete justification of all the aspects of the situation that had seemed incongruous, based on sound logic and actual facts about the world. Conversely, only in the Full case can resolution consist of non-faulty logic whose consequence is the (initially) incongruous material, since faulty logic would allow some incongruity to remain.

Partial: A less radical form of resolution offers a motivation for the incongruous information, but either this justification is incomplete (i. e. covers only some aspects of the incongruity) or is itself faulty in some way, either being based on unsound reasoning or relying on incorrect assumptions about the world. The overall effect is to leave some residual incongruity, either as an unexplained part of the original incongruity, or by introducing some new oddities (which could be in the faulty logic used, or the addition of further invalid assumptions about the world (Rothbart/Pien 1977, Suls 1983)).

Null: Null resolution is not strictly a form of resolution, but is included to here to cater for the case where there is incongruity but nothing that even partly justifies the incongruity. This is sometimes referred to as »nonsense« humour (Hempelmann/Attardo, forthcoming).

As will be shown in Section 4 below, opinions vary on the relevance of each of these.

4. Theoretical Variants

We can now use the conceptual framework set out in the previous section to compare and contrast some of the versions of IR that have appeared. We will focus primarily on the two extremes: seminal proposals from the 1970s and more recent (and quite different) versions. As noted earlier, the chronology of the literature on IR reflects this span, with very few new variants in the 1980s or early 1990s.

4.1 Shultz

The research of Shultz (1970, 1972) has been very influential in the modern era of IR theory. Shultz carried out two experiments in which children responded to cartoons, created in the following way. A number of single-frame cartoons were found which were deemed to include both incongruity and resolution, as rated by knowl-

edgeable judges. In one experiment, the data included the original cartoons and variants in which the incongruity had been removed, but the resolution left in place. In the other experiment, the comparison was between the original and a version with the resolution removed (the Information Content for the resolution, in the sense of Section 3.5 above), but the incongruity left unaltered. Shultz used analysis of variance to examine a large number of effects, which there is not space to cover here. A central finding was that the originals (with both incongruity and resolution) were found to be more amusing than the two variants with components removed. Shultz collected explanations of the cartoons from the participants, and he conjectures that the order in which the incongruity and the resolution show up in the commentaries by the children reflects the order in which these aspects of the cartoons are recognised. If that is the case, the perception of the incongruity usually (but not invariably) precedes perception of the resolution. Shultz's notion of incongruity is:

An incongruity is defined as the simultaneous presence of two or more habitually incompatible elements, where an element can be either an object or an event.

Shultz also glosses incongruity in terms of »expectation«, using quite a general notion of expectation, not tied to the prediction of events within a temporal sequence: an element of the cartoon »has its usual context of occurrence« which leads to »expectations about what other sorts of elements will also be present«. That is, an »expectation« is more like a compatibility constraint on the other elements present in the stimulus, rather than a temporal prediction.

How can we classify Shultz's position using our headings? On the one hand, the scope seems to be all of humour: Shultz refers to »the author's version of a structural theory of humour« (1972, 457). However, the experiments seem to cover just uncaptioned single-frame cartoons, and he states (*ibid.*, 477) that he is still investigating the possibility that verbal jokes and riddles possess similar structural features. Shultz hypothesises sequential processing (incongruity before resolution), although much of his framework is independent of this conjecture. Given the restricted type of humorous material, the only location for the incongruity is what we have called part of the conveyed scenario. He implicitly makes the distinctions between the facets of resolution: some of the cartoons have their resolution »removed« (i. e. the Information Content is excised), there are various kinds of resolution, such as »physical analysis«, »motivational conflict«, »participant misapprehension«, which seem to be different Cognitive Rules, and Shultz discusses temporal ordering, which clearly alludes to the Resolution Process. The extent of resolution proposed seems to be Full: in discussing an example, Shultz says of a resolved situation that »[...] it is, in a sense, appropriate [...]« and »[...] it is no longer inappropriate [...]«. (The phrase »in a sense« is perhaps a hint at Partial resolution.)

4.2 Suls

Another founding pillar of IR theory is the two-stage model of Suls (1972). The scope is stated as being jokes or cartoons with verbal punch-lines, and the approach is definitely sequential: the processing of the humour is shown as a flow diagram, as in Figure 1.

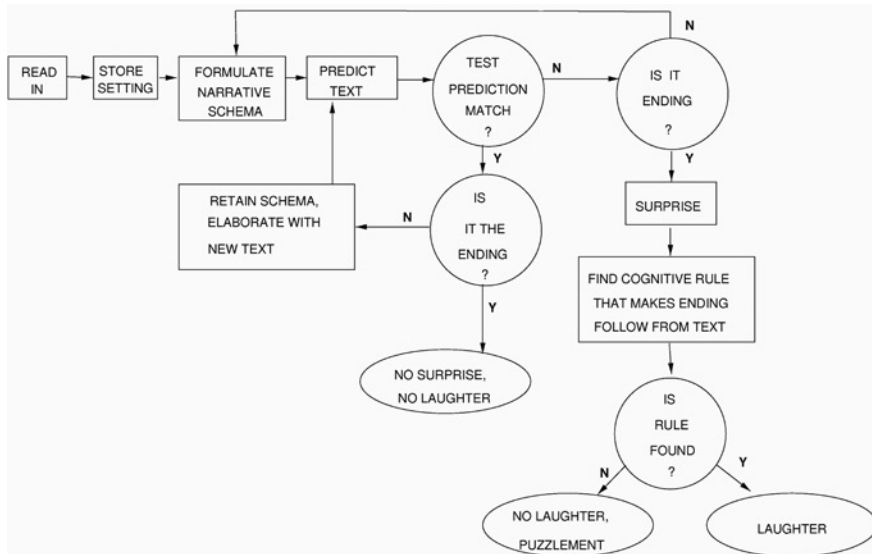


Figure 1: Suls' Two-Stage Model

The central cycle is the absorption of new information from the text or picture, and incongruity occurs when the latest piece of information (typically, a sentence) does not seem to fit with the existing understanding of the preceding material; that is, what we have termed set-up/punch-line conflict. The audience seeks to find a cognitive rule (cf. Section 3.5) to overcome this lack of fit, and if one is found then amusement results. In his 1972 article, Suls does not yet use the term »resolution« for this second phase (cognitive rule application), but it corresponds to Full resolution: »the punch line is then perceived to make sense [...] the apparent incongruity has been made congruous« (ibid., 88). All three facets of resolution show up clearly in Suls' account: the punch-line provides the Information Content, there is the need for a Cognitive Rule, and his entire proposal is based on there being a Resolution Process.

4.3 Oring

Oring (2003) argues that all humour is created by appropriate incongruity, and he gives as examples of this (11), (12) and (13).

- (11) A man goes to see a psychiatrist. The doctor asks him, ›What seems to be the problem?‹ The patient says, ›Doc, no one believes anything I say.‹ The doctor replies, ›You're kidding!‹ (ibid., 1)
- (12) Man is the only animal that chews its ice cubes. (ibid., 5)
- (13) Why should you always wear a watch in the desert? Because a watch has springs in it. (ibid., 6)

His model is non-sequential, in the sense that there is no need for the incongruity to be perceived prior to the resolution. Oring regards sequentiality as a defining property of IR theories, thus viewing his own proposal as not being IR. Nevertheless, Oring's ideas are included here because they are clearly based on incongruity plus some pseudo-justification of that incongruity, and because they link to some more recent work (Section 4.4). For Oring, it is sufficient (and necessary) for the incongruity and some justification for it both to be present. As this is a non-sequential framework, it is not meaningful to ask where the incongruity is located within the processing; the incongruity, in the terminology here, is part of the conveyed scenario. Oring's notion of ›appropriate‹ is a form of Partial resolution, allowing (in fact demanding) that the incongruity is not eliminated. The combination of a non-sequential IR theory with Full resolution would not make sense, as the stimulus – joke, cartoon, etc. – would simply not be incongruous if it also contained enough valid content to completely eliminate the incongruity, and this was available before (or along with) the perception of the incongruity. Also, Oring's stipulation that the incongruity be ›appropriate‹ rules out Null resolution.

4.4 The SSTH/GTVH

The Semantic Script Theory of Humour (Raskin 1985) was originally declared not to be an incongruity-based theory. The central idea of the SSTH is that information (as conveyed in a text) can be represented by abstract knowledge structures called ›scripts‹, and a text can be compatible with more than one such representation. If two of these representations clash in a specific way – script opposition (SO) – then the text is a joke. One perspective (Giora 1988) is that SO is in essence a formulation of the traditional notion of incongruity, a position that was later accepted by one of the leading proponents of the SSTH (Attardo 1997).

SO is often illustrated with examples in which the incongruity seems to be what we have labelled alternative interpretation contrast – (8) above is the central example in the original exposition of the SSTH. However, other demonstrative examples

suggest that it can also be part of the conveyed scenario, since it is applicable even where there is no formal division into alternative readings.

Hempelmann/Attardo (forthcoming) usefully distinguish *completely backgrounded*, *backgrounded* and *foregrounded incongruities*, where the first two types are merely part of the setting of the joke, but not directly involved in the humour-creation. Script opposition (SO) describes foregrounded incongruity.

The General Theory of Verbal Humour (Attardo/Raskin 1991) extended the SSTH by the addition of further classification categories for jokes, including the Logical Mechanism (LM). Although the LM was rather under-defined, a later article stated that while SO represented the incongruity, LM constituted the resolution (Attardo 1997). This IR-GTVH synthesis was a sequential model, the scope of which was all »verbal« humour, which meant any humour expressed in language (not the narrower sense of word-play or punning (Attardo 1994, 27)). There have subsequently been studies which apply the GTVH categories to humour expressed (in whole or part) visually (Paolillo 1998, Hempelmann/Samson 2007; 2008), but it remains to be seen whether its scope is to be widened to make it a universal theory.

It is not entirely clear from published articles what, formally, the LM is defined to be within the GTVH. It is discussed as being a property of the text (Attardo/Raskin 1991, Ruch/Attardo/Raskin 1993), which suggests that it might be what we have called the »Information Content«: something within the text's content which allows resolution. On the other hand, illustrative examples (Attardo et al. (2002) has an extensive list) seem to be general patterns (as in Shultz's discussion), which suggests that a »Cognitive Rule« is involved. Hempelmann/Samson (2008, 628) say that »LMs describe the relation of two opposed scripts, or the cognitive rule that has to be recognized in order to understand the punch-line.« Similarly, the single example of resolution in Attardo (1997) consists of a general rule. Nevertheless, Attardo (ibid.) stresses that the LM is the actual dynamic resolution (our »Resolution Process«). Although the LM was originally an obligatory part of every joke, later expositions have the LM as optional, thereby allowing Partial or Null resolution (Attardo 1997). Hempelmann/Attardo (forthcoming) state that there is no Full resolution within the GTVH, but there can be »nonsense« jokes in which there is no resolution/LM. (Hempelmann/Samson (2007) state that the LM is one of the necessary and sufficient properties for a text to be humorous, thus ruling out Null resolution, but this seems to be an aberration from current doctrine.)

Hempelmann/Attardo (forthcoming) accept Oring's (2003) distinction between IR theories (inherently sequential) and »appropriate incongruity« (non-sequential) theories, and state that the GTVH falls under the latter, being an IR theory without a specified order of presentation. Their equation of SO + LM to incongruity + resolution indicates that they also see Oring's ideas as very close in spirit to the IR approach.

5. Empirical Studies

Although the principal focus here is on theoretical frameworks, it is worth mentioning briefly some experimental work which, in one way or another, impinges upon the question of what constitutes IR. What becomes clear from these studies, from the perspective of humour analysis, is that there are informal notions of IR that are very widespread within the field, to the extent that researchers feel confident in using their own intuitions to label examples of humour in these terms. However, there is variation in the exact meaning that experimenters attach to the labels, so the appearance of an accepted theoretical framework is slightly misleading.

5.1 Responses with Brain Damage

Bihrlé et al. (1986) present a study of the effects of brain damage on a person's ability to comprehend humour. They refer to the Shultz/Suls' model as »widely accepted«, glossing it in terms which are sequential, locating the incongruity as a violated expectation (cf. Section 3.3 above), with Full resolution. Of an earlier study in this area, they comment: »The results of the Brownell et al. (1983) study provided empirical support for the Incongruity-Resolution model of humor processing described above.« What, then, did that 1983 study establish? Brownell et al. give an outline of a sequential IR-style model, citing Suls (1972) as »an example of such a two-stage model«. Their chosen constructs for describing the process are *surprise* (experienced by the audience on encountering the punch-line) and *coherence* (the final state after resolution). The experiment compared right-hemisphere-damaged (RHD) subjects with undamaged controls. The subjects were shown very short story texts, with a choice of four possible one-line endings, exactly one of which had been designed to form a joke, and one of which was a *non sequitur* which lacked coherence even as a joke. Subjects were asked to select which ending would complete the text as a joke. The RHD subjects were much poorer than the controls in selecting the joke endings, and also tended to select the *non sequitur* endings (as valid joke endings). Brownell et al.'s conclusion is that RHD subjects can detect surprise (a property shared by joke and *non sequitur* endings) but have a poorer grasp of coherence (which distinguishes joke from *non sequitur* endings).

The later experiment by Bihrlé et al. replicated these findings but in addition showed that left-hemisphere-damaged patients were poorer at detecting the surprise, but had a normal ability to establish coherence within narratives. Shami/Stuss (1999) carried out a similar experiment with the same test materials, mentioning (without discussion) that these texts exemplify the Suls IR model. While these findings can be said to support the decomposition into two aspects – surprise/incongruity and coherence/resolution – it is less clear that they support the specific details of the Suls/Shultz model, as opposed to other variants of IR.

One could argue that these effects support Oring's model of appropriate incongruity – the subjects showed separate abilities at detecting incongruity and detecting appropriateness.

5.2 The 3WD Categories

The IR approach was given renewed impetus as a result of the development of the 3WD test (Ruch 1992). This test contains a number of jokes and cartoons, and participants are asked to rate each item (on a scale) for how funny and how »averse« it is. Each participant can then be classified in terms of his/her taste in humour.

The test was developed through a number of cycles in which sample items (jokes, cartoons) were rated by volunteers. A statistical technique called factor analysis was applied, to detect underlying patterns in the collection of human judgements. The starting point for the factor analysis is the observation that responses to some items are correlated: a person who rates one particular item highly may tend to give some specific other item a very poor rating, or two items may tend to get similar ratings from most participants. Factor analysis detects these patterns and constructs an abstract set of factors (abstract dimensions) along which the items appear to be varying. It also connects the original items to these factors, in the sense that it gives a way of converting any set of judgements about the items into a set of positions on these dimensions. This technique is widely used to pin down the fundamental variations within collections of data, since it usually proposes a much smaller number of dimensions than the number of original items, and these dimensions describe the actual variation in the data more exactly. The resulting 3WD questionnaire contains particularly clear exemplars of the abstract underlying factors.

An important point here is that factor analysis does not *explain* any of the properties of the items in the questionnaire. It merely uses the patterns of correlations (between responses to humorous items) to postulate abstract »factors« which appear to be involved. It does not say what these factors are, except in terms of their connections to the original data items.

Ruch et al. found three dominant factors in their analysis. As is customary in such situations, they then inspected the relationship between these abstract factors and the original data, to get some intuitive notion of what these factors might correspond to. Based on their own perception of which humorous items tended to score highly on each of the three factors, they devised an informal description for each factor, as follows: *incongruity-resolution* (INC-RES), *nonsense* (NON), *sexual humour* (SEX). Ruch describes »nonsense« humour as having »a surprising or incongruous punch-line, exactly as in incongruity-resolution humor«, but not fully eliminating the incongruity; that is, NON is a form of Partial resolution. Ruch (2008, 48) makes it clear that INC-RES humour involves Full resolution. Formally, as INC-RES and NON are independent factors, it is possible for a joke or cartoon to

correlate highly with *both* of these – they are not, strictly speaking, disjoint categories.

What the 3WD work provides is a collection of jokes and cartoons, some of which fall naturally into an INC-RES class, some being naturally classed as NON. This does not, however, tell us formally what constitutes incongruity or resolution (Full or Partial) – it simply gives an ostensive definition by saying that these particular jokes/cartoons are good exemplars of these two categories.

5.3 The Course of Disambiguation

Vaid et al. (2003) describe an experiment which examines the flow of processing of meanings during simple narrative jokes. The authors (*ibid.*, 1432–1434) espouse the »forced reinterpretation« scheme (Section 3.3 above), in which the initial set-up has an obvious interpretation and also a less obvious interpretation, with the punch-line unexpectedly bringing to attention the less obvious of these. To judge from their example dissection of a joke (*ibid.*, 1436), they allow for the incongruity arising before the final line of the text (the punch-line), with the punch-line »explaining« that earlier incongruity. This contrasts with the widespread idea that the incongruity occurs when the punch-line is encountered, with resolution via reasoning (*cf.* Suls, Shultz). Using standard psycholinguistic methods, Vaid et al. traced the activation of different interpretations for the reader. During the set-up, the reader considers the obvious interpretation; after meeting the punch-line, both interpretations are briefly active for the reader; finally, the initially obvious, but now less preferred, interpretation decays in salience, until only the second interpretation is active for the reader.

Vaid et al. suggest that these findings support, in various ways, the proposals of Attardo (1997) and Giora (1991). What they do not analyse is the connection of this temporal flow of understanding to the creation of humour. Simply having to revise one's interpretation of a text in the light of new information is simply a temporary misunderstanding, and is not sufficient to create humour. As the experimenters did not test texts in which there were non-humorous misunderstandings, it is hard to extract from the findings any lesson about what it is that makes a text a joke rather than simply an initially misleading text.

The experiments did not set out to clarify the nature of incongruity and resolution within jokes, merely the time course of activation of the two different meanings.

5.4 Brain Activity

Samson and colleagues have carried out a number of investigations in which fMRI techniques were used to monitor the brain activity of subjects while they were ex-

perceiving jokes and cartoons (Samson/Zysset/Huber 2008, Samson/Hempelmann/Huber/Zysset 2009). In particular, these authors found that different areas of the brain become active when a person is absorbing different classes of joke. The findings of these studies are presented in terms which use the terminology of joke analysis, such as »incongruity resolution« and »logical mechanism«. Samson et al. (2008) considered what they termed three »logical mechanisms« – *visual resemblance*, *theory of mind*, and *semantic relations* – and found differences in reactions to these. However, these are extremely broad categories, and it is not clear that these labels describe how an incongruity (or script opposition) is »resolved« in any general sense; that is, they do not seem to be the more fine-grained, logic-related »logical mechanisms« of the GTVH (Section 4.4 above). Samson et al. (2009) used the 3WD classes of INC-RES and NON (Section 5.2 above) to classify their stimuli, glossing these as having Partial resolution (»almost completely resolved«) and Null or Partial resolution respectively (this differs from Ruch's description of these terms). Again, a difference between the types of joke/cartoon was found, in terms of activation of the brain, and Samson et al. discuss why the need to integrate more information (in INC-RES examples) could lead to the activation patterns found.

6. Conclusions

Incongruity resolution is widely regarded as an explanation of much humour, and (as illustrated in Section 5) often assumed to be an established concept. We have tried, therefore, to clarify some of the ideas surrounding IR, in the hope of putting discussions on a firmer base, with less scope for mutual misunderstanding. It appears that IR is not so much a theory as a family of theories, within which definitions vary, both of incongruity and of resolution. There are also different opinions about what proportion of humour is dependent on IR.

There is a considerable contrast between the original IR versions (from the early 1970s) and more recent characterisations. Although the Suls/Shultz conception was both strongly sequential and involved Full resolution, both these assumptions have been questioned. Nevertheless, the sequential model is still the image of IR that most researchers seem to have in mind, as exemplified by the work described in Section 5.

Is there any common core that all the variants adhere to? Let us first set aside humour involving no resolution. If that were to be included, then any core precept would not involve resolution in any way. Instead, if we restrict the scope to proposals involving some degree of resolution, then it appears that the most substantial core statement is the following:

All humour involves some degree of incongruity, but this incongruity is not random or arbitrary – it is systematically related to other aspects of the setting.

This »lowest common denominator« (which is very similar to Oring's proposal for »appropriate incongruity«), is very general, so that one could view other variants as being more specific versions of this formulation. For example, the original Suls model could be seen as a more specified version, including the additional ingredients of both sequentiality and Full resolution. Unfortunately, the general formulation does not claim very much, so that even if it is completely correct, it does not tell us much about the workings of humour.

The question of empirical confirmation of the precise details of an IR model (as opposed to more broad-brush support, as in Section 5.1) is still relatively under-explored. As Rothbart (1977, 91) observed: »[...] precise definitions of both incongruity and resolution will be necessary in order for progress to occur«. Although matters have improved in this respect over the past few decades, there are still no clear, formal, agreed definitions of »incongruity« or of »resolution«. We hope that the clarifications in this paper will help to move matters forward in this direction.

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