Citation for final published version:

Baker, Guilia and Aldridge-Waddon, Michelle 2021. Disambiguating ambiguity: Providing a framework for classifying types of ambiguity. Linguistics and the Human Sciences 14 (3) , pp. 237-260. 10.1558/lhs.19339

Publishers page: http://dx.doi.org/10.1558/lhs.19339

Disambiguating ambiguity: providing a framework for classifying types of ambiguity

by Giulia Baker, Michelle Aldridge

Abstract
This paper addresses inconsistencies in findings for children's humour development by examining the ways in which five different ambiguity types (lexical, phonological, morphological, syntactic and idiomatic) have been interpreted and applied in earlier studies on humour comprehension. It identifies discrepancies in linguistic phenomena perceived to constitute each ambiguity type and highlights how differences have contributed to contrasting claims being made about ambiguity types comprehended by young children during the final humour stage. Definitions are subsequently provided for each ambiguity type examined. Definitions accommodate the fact that verbal humour is intrinsically embedded with the form in which it is delivered (i.e. the language in which it is communicated) and are based upon linguistic phenomena through which ambiguity types are manifested. Application of these definitions should now allow the researcher to be sure of linguistic phenomena being tested at any given time and facilitate comparison and contextualisation of findings across future studies.

Key words: ambiguity, comprehension, definition, humour

1 Aim of paper

The current paper aims to address the fact that there are no established ambiguity classifications to which a researcher might refer when testing children's humour comprehension. Its focus is to examine five different ambiguity types (lexical, phonological, morphological, syntactic and idiomatic) through close analysis of linguistic phenomena manipulated to elicit humour. The objective is to identify the different ways in which these ambiguity types have historically been interpreted and to address any emergent inconsistencies by providing precise definitions for each type for future application.

Definitions will be informed by the combined analysis of published taxonomies, prior studies and linguistic phenomena manipulated to elicit humour in contemporary verbal riddles, the joking format most favoured by young children (Wolfstein, 1954; Zipke, 2007, 2008). Each definition will be based upon the way(s) in which linguistic features embedded within riddle form(s) (i.e. within the riddle's actual wording) contribute to producing an ambiguity and will uniquely identify the type of ambiguity being tested so as to reduce any potential interplay between different ambiguity types. These definitions will allow the future humour researcher to be sure of the type of ambiguity being tested at any given time. They can be replicated and applied in future studies on children's humour comprehension to allow for consistency in the type of language phenomena tested. This, in turn, might allow findings to be compared and contextualised more readily across studies, thereby contributing to a more comprehensive body of knowledge within the field of children's humour development than has been the case to date. Such knowledge will benefit not only theoretical advancement but also practical application within the classroom. Humour helps develop creativity and divergent thinking (Ziv, 1976, 1983, 1988) and ambiguity based humour in particular can be used

1

to help extend higher order reading skills (Yuill, 1998; Zipke, 2007, 2009) and raise reading levels (Yuill, 1998; Zipke, 2008). To fully exploit ambiguity based humour as a resource with which to extend learning, however, we first have to understand which types are understood at different stages of development. Previous attempts have been made to investigate this matter but inconsistencies in the interpretation, classification and application of ambiguities have prohibited advancement of theoretical understanding. The definitions provided herein aim to address such inconsistencies. When applied in future studies they should allow for the advancement of theoretical understanding about humour development and also facilitate practical application within the classroom.

2   Review of the literature

There have been many studies on children's understanding of ambiguity based humour, particularly during the 1970s and early 80s, with the aim commonly focused upon determining the age during which children start to comprehend ambiguity based humour. The general consensus arising from this research is that the age of 7, when children typically experience cognitive changes linked with the transition from a stage of preoperational to concrete operation thought (within a Piagetian framework), is when the requisite skills for processing and comprehending ambiguity based humour first starts to develop (McGhee, 1977, 1979, 2002; Bariaud, 1989).

Although those cited above concur as to the stage/age during which children start to comprehend verbal ambiguities, they, and others, differ as regards the facility with which different types of ambiguities are comprehended by young children (Shultz and Pilon, 1973; Shultz and Horibe, 1974; Hirsh-Pasek, Gleitman & Gleitman, 1978; Yuill, 1998). This is likely to be, at least in large part, due to the fact that findings stem from early research conducted within the fields of psychology and humour studies and not within the field of linguistics. Whilst different types of language specific ambiguities were included in such studies, the focus often centred upon developing a framework to account for children's humour advancement, rather than upon the specific properties of language that were being tested. Previous studies frequently lack ambiguity definitions, leaving the reader unsure of what language phenomena they are supposed to embody. Even when definitions are included, they are often broad and generic and not always interpreted or applied in the same way. This has lead to the same linguistic phenomena being tested under different ambiguity classifications and different linguistic phenomena being tested under the same ambiguity classification. If one takes, for example, the popular riddle 'What's black and white and *red/read* all over?' 'A newspaper', this riddle has been interpreted as being *morphologically* ambiguous by Green and Pepicello (1984), *lexically* ambiguous by Yuill and Oakhill (1991) but is cited as having *phonetic* ambiguity at its core by Ben-Amos (1976). Were Lew (1996a, 1997) to apply his criteria to this particular riddle, it is likely he would interpret it as relying on none of these categories but on that of *syntactic class* (Lew 1997). Hence different linguistic properties have been tested under varying classifications with findings for children's comprehension of discrete ambiguity types consequently varying across studies. This not only leads one to question the validity of earlier claims but also makes it difficult to (a) compare findings across the field and (b) to make informed judgements about the types of ambiguity first comprehended by children as they start to comprehend humour based upon ambiguity and dual meanings.

This then brings us to the current paper. Although selected umbrella terms have previously been used to describe various ambiguity types, they have not always been interpreted or applied in the same way across studies. They cannot, therefore, be taken to comprise constant variables. This not only prohibits comparable analyses but also restricts the development of a more comprehensive body of knowledge about children's humour development than might otherwise be possible. In order to directly address this matter the current paper provides uniform definitions for five discrete ambiguity types (lexical, phonological, morphological, syntactic and idiomatic) for practical application in studies on children's humour development. These definitions accommodate the fact that verbal humour is itself communicated through the medium of language and, specifically focus upon the linguistic phenomena (i.e. the actual wording) through which humour is elicited. The definitions were developed during the course of a study on children's comprehension of ambiguity based riddles (███████) and address shortcomings in earlier studies where focus has tended to centre upon the advancement of understanding about children's humour development rather than upon the specific linguistic phenomena underpinning the development of this knowledge. They aim to eliminate discrepancies in linguistic phenomena comprising discrete ambiguity classifications in humour studies and to enable the researcher to be sure of the linguistic phenomena tested at any given time. The definitions can now be replicated to provide consistency in interpretation and application of ambiguity types across future studies. This should in turn facilitate comparison of findings across studies in future and contribute to the development of a more extensive body of knowledge about children's humour development than has been possible thus far.

3 Ambiguity

Before defining each of the five different ambiguity type discussed herein, it first makes sense to define 'ambiguity' itself. The term ambiguity is typically used to denote oral or written circumstances in which language is used which is fixed in form but open to having its meaning(s) interpreted in more than one way. Ambiguity itself is a general concept, however, and can be manifested at different levels of language. Researchers have previously attempted to differentiate between different types of verbal ambiguity by examining the underlying properties of language used and the arrangement of specific words and phrases (Pepicello, 1980; Pepicello and Green, 1984; Chiaro, 1992; Lew, 1996a, 1996b, 1997; Oaks, 1994; Dubinsky and Holcomb, 2011; Aarons, 2012). Ambiguity categorisation is diverse, however, with scholars distinguishing numerous different categories and sub categories of ambiguity, the scope of which exceeds the boundaries of this paper. Ambiguity types analysed here are therefore limited to five based upon the following criteria:

- Types of ambiguity relate to categorisations and findings commonly used in previous studies on children's humour development (although categories are subject to variation) (Shultz and Pilon, 1973; Shutlz and Horibe, 1974; Fowles and Glanz, 1977; Hirsh-Pasek et al., 1978; Yuill, 1998).
- Ambiguities are all *verbal* ambiguities, i.e. they are based upon properties of language used within the riddle.
- Categories correspond with the types of ambiguity commonly found in contemporary children's riddles.

Ambiguities meeting the above criteria comprise lexical, phonological, morphological, syntactic and idiomatic ambiguities respectively and are now discussed below.

3.1 *Lexical ambiguity*

Lexical ambiguity is one of the categories most frequently used to test children's humour development and has appeared in studies by Shultz, (1974), Shultz and Horbe, (1974), Brodinksy (1977), Fowles and Glanz (1977), Hirsh-Pasek et al. (1978), Yuill (1998) and Zipke (2007). The popularity of this categorisation may lie in the fact that the majority of the 1,000 most common words in English are multiply ambiguous (Cairns 1999 cited in Zipke, 2008:2). Hence lexically ambiguous jokes are said to form the most frequent single category of linguistic jokes (Attardo, Attardo, Baltes & Marnie et al., 1994).[1]

Although this type of ambiguity frequently occurs in studies on children's humour and ambiguity comprehension, there has not always been consensus as regards the linguistic phenomenon it comprises. For example, Shultz and Pilon interpret lexical ambiguity as existing 'when a given lexical item has more than one semantic interpretation' (Shultz and Pilon,1973:728) although they later restrict this to cases of 'polysemy'. They also choose to classify 'he goes to the bank' (river or financial) as being lexically ambiguous but to classify 'he saw three pears/pairs' as being phonologically ambiguous - despite the two words having identical phonological representations when orally delivered. In contrast, both Pepicello (1980) and Green and Pepicello (1979, 1984) consider this type of linguistic phenomena ('what turns but never moves?' 'Milk') to constitute a different category of ambiguity altogether, including it instead within the category of phonological ambiguity (further discussed below).

As noted above, lexical ambiguity has previously been intepreted as occurring when there is 'a word with more than one possible meaning in a context' (Oaks, 1994: 378) and as deriving 'solely [from] the alternative meanings of an individual lexical item' (Crystal, 2008: 23). These are rather broad definitions, however, and could also be said to relate to ambiguity types other than lexical ambiguity (such as syntactic ambiguity discussed below). Hence Zipke (2007: 382) attempts to refine lexical ambiguity a stage further by stating that it occurs when a 'word has more than one meaning without a class violation.' She highlights the fact that lexical ambiguity does not depend upon grammatical analysis of the sentence (i.e. it does not require syntactic analysis) but solely upon two different meanings that have the same word form. She makes a vital distinction here as words and meanings which involve a change of word class require an additional level of processing and therefore pose a greater cognitive challenge in order that they be comprehended. Whilst this has often been overlooked in previous studies, it is a matter soundly accommodated within the definitions provided within this study.

In the current context lexical ambiguity is viewed as occurring when two different meanings have the same word form (and do not involve a change class). It thus encompasses two closely related types of wordplay, namely homonymy and polysemy. The first of these concepts**,** homonymy, is viewed as occurring when a word exists which is either spelt like another word or pronounced like another word, but which has a different meaning. For example, in the riddle:

'What fruit do you find on coins?'
'Dates'.

lexical ambiguity is manifested through the single form 'dates' having two discrete meanings, namely 'points in time' and 'a type of fruit'. The two meanings share the same phonological and graphological form but are not perceived as being related in any way. Identicality of phonological and graphological form(s) are deemed to be coincidental rather than intentional or derivational.

The second of these concepts, polysemy, is also manifested when two identically written, and pronounced, words carry two different meanings. Unlike homophony, however, polysemous words are deemed to share the same etymons and to bear a semantic/cognitive relationship. So close is their purported relationship that the two identically written, and pronounced, words are, in fact, said to comprise the *same* word (or lexeme) e.g. *wood* (a natural material) and *wood* (area of land covered with trees).

The distinction between homonyms and polysemes can frequently provoke debate but it is not one that should deter the humour researcher. As Blake (2007: 69) points out, 'whether it is a matter of two separate roots happening to be pronounced alike or a particular word developing different meanings, the result is the same: one form has more than one meaning'. Hence, in practical terms, it makes little difference to the listener of an orally narrated verbal riddle whether the ambiguity depends upon homonyms or polysemes. Their form, terminology, definitions and derivations may well differ but both perform a similar role in the context of the orally narrated verbal riddle. Both involve a single phonological form having two (or possibly more) meanings, which means that each form operates, and is treated, by the listener as one and the same. Ambiguity arises not from differences in graphological representation or etymology (which remain unseen) but from the fact that two different meanings are contained within a single identical phonological representation. Listeners, especially young children, are likely to be unaware of the terminology related to these concepts, or of the differences between them, but this need not necessarily affect their ability to identify (and resolve) ambiguities based upon them.[2] Hence both homonyms and polysemes are included within the category of lexical ambiguity as defined in Section 5.1. That both homonyms and polysemes should be included in this category, is reflected in the responses of listeners[3] who communicate their understanding[4] of lexical ambiguity thus:

Figure 1: Explaining lexical ambiguity

Why can you never win at cards in the jungle? Because there are too many **cheetahs/cheaters** *(homonym)*	
Year 2	'Because there was an animal called a */ʧiːtə/** and if you like cheat at a game you're called a */ʧiːtə/.'*

5

Year 4	'Too many /ʧiːtəz/ because like when you play cards /ʧiːtə/and the animal /ʧiːtə/ in the forest.'
Year 6	'Because there are /ʧiːtəz/ as in the animal and /ʧiːtəz/ as in someone who doesn't play fair.'

Why did the teacher have to wear sunglasses? Because her pupils were so **bright** *(polyseme)*	
Year 2	'Cos bright sometimes is really like the sun bright and there's something like bright pupils, they're really h- good pupils and stuff that's basically it.'
Year 4	'Because she can be bright as in very clever or you can be bright as in something's bright and you can't see it very well.'
Year 6	'I chose this one because children are bright um in this riddle if you used it as bright as s unny bright as a light and ... you can be bright as brainy and you can be bright as like l- light.'

* Homophones were transcribed phonetically in the original study so as not to influence raters to one meaning over another when scoring explanations for statistical analyses

Such explanations reinforce the validity of the definition of lexical ambiguity provided in Section 5.1. Both definition and explanations reinforce Shultz & Pilon's earlier claim that lexical ambiguity occurs 'when a given lexical item has more than one semantic interpretation' (Shultz & Pilon, 1973:728) but challenge their assertion that lexical ambiguity is based only upon polysemous relationships. Rather, they reflect this type of linguistic phenomena as being manifested through a single phonological form bearing two distinct meanings, irrespective of graphological representation or etymology, within a single grammatical class.

3.2 *Phonological ambiguity*
Much like lexical ambiguity, phonological ambiguity is typically found in studies on children's humour comprehension. This type of ambiguity occurs when the phonological system of English is manipulated in order to produce a humorous effect. It is manifested when sounds are modified so that words are made to sound like other words. The modification of sounds often involves paraphony (near homophones) which 'forces bisociation on the basis of forms that are similar rather than identical in sound' (Dienhart, 1999: 123). When paraphony occurs the joke teller usually provides only one

script 'but standing as close as it does to a script shared by speakers sharing the same culture . . . it mentally creates the second script as a kind of echo' (Dienhart, 1999: 123).

Although phonological ambiguity has frequently been used in studies on children's humour comprehension, there is nonetheless debate as to whether or not it merits a standalone category of ambiguity at all. Pepicello (1980), Green and Pepicello (1979, 1984) and Binstead and Ritchie (1997) all assert that it does, as do Shultz and Pilon (1973), Shultz (1974), Shultz and Horibe (1974), Brodinsky (1977) and Hirsh-Pasek et al. (1978) who have all used phonological ambiguity as a category with which to test children's emergent humour comprehension. In contrast, Fowles and Glanz (1977) and Yuill (1998) choose not to categorise or test this type of ambiguity[5] whilst Lew (1997), rather than assigning it a category of its own, treats phonological distortion instead as a 'device' which cuts across, and interplays with, a range of other more easily distinguishable discrete types of ambiguity. Lew still makes reference to what he terms the 'phonological joke' though, which he regards as any joke with 'two typically different phonetic strings [to be] jointly served by one phonetic form, which may be identical with one of the two, but it may also bridge the gap between the two by combining some elements of the two' (Lew, 1997: 9). His definition of the 'phonological joke' is very similar to Hirsh-Pasek et al's (1978: 115) description of 'phonological ambiguity' which they regard as occurring 'when two similar phonetic sequences (which differ only in a single phonological segment) identify two separate words, which have different meanings'. Lew himself has acknowledged the similarity, although he does query the 'single segment' difference limit. Both descriptions embody similar phonological phenomena but Hirsh-Pasek et al. (1978) endorse phonological ambiguity as a stand alone category whereas Lew (1996a, 1997) does not.

As well as the debate as to whether phonological ambiguity merits independent status or not, further discussion about this particular ambiguity type centres upon the linguistic phenomena through which it is realised. Phonological ambiguity has been interpreted and applied in considerably different ways both across, and within, earlier studies. For example, the riddle:

'What *turns* but never moves?'
'Milk.'

is viewed by both Pepicello (1980) and Green and Pepicello (1979, 1984) as being phonologically ambiguous. They claim this is because 'the basic strategy employed at the phonological level is simple lexical ambiguity . . . [whereby] two different underlying semantic elements have an identical surface form' (Green and Pepicello, 1984: 194--195). There is no modification of sound(s) in this example, however, nor in the definition of phonological ambiguity provided. This contrasts with the other examples of phonological ambiguity they provide, namely minimal pairs and metathesis (Green and Pepicello 1984), both of which depend upon sound manipulation in order to elicit humour.

Further irregularities can be found in the studies of Shultz and Pilon (1973) and Shultz and Horibe (1974), both of whom claim phonological ambiguity to occur 'when a given

phonological sequence can be interpreted in more than one way' (Shultz and Pilon, 1973: 728, Shultz & Horibe, 1974: 14). They give as examples:

- ambiguities arising from homophony (pears/pairs)
- ambiguities arising from confusion about the boundaries between words (eighty cups/eight tea cups)
- ambiguities arising from sound differences (line/lion)
  (Shultz and Pilon, 1973)

Although it is only the latter that involves the modification of sounds (in terms of phoneme alteration), Shultz and Horibe nonetheless argue that all three examples constitute phonological ambiguity. They justify the inclusion of homophony (i.e. pear/pair) because of 'similar pronunciations' (despite the fact that most native speakers of British English would pronounce 'pears' and 'pairs' in an identical - as opposed to a 'similar'- fashion) and include 'eighty cups/eight tea cups' in the category of phonological ambiguity because it constitutes 'a confusion about the boundaries between words' (Shultz & Pilon, 1973: 728). Whilst word boundaries are themselves admittedly affected by juncture and word stress - both themselves phonological phenomena - ambiguities relying upon differences in word boundaries are generally included in the category of morphological ambiguity (see Section 3). Shultz and Pilons' lack of consistency as to what actually constitutes phonological ambiguity means that it is difficult for the researcher to determine precisely what the above examples all have in common.

There are similar inconsistencies in the study of Binstead and Ritchie (1997) who describe phonological ambiguity in terms of metathesis, syllable substitution and word substitution. The examples they provide of metathesis and syllable substitution all include the manipulation of sounds (through phoneme substitution), yet only one of the three examples they provide for word substitutions relies upon sound manipulation, the other two relying upon homophony and homonymy. Binstead and Ritchie nonetheless justify all three of their examples as constituting phonological ambiguity by claiming that 'a word can be confused with: an alternate meaning ('blue', the color with 'blue', the mood); a word spelled differently but sounding the same ('carats' with 'carrots'); or a word that sounds slightly different, as in: Where elves go to get fit? Elf farms' (Binstead and Ritchie, 1997: 32).

It is, thus, evident that phonological ambiguity is interpreted in a wide range of ways. Some scholars view it as an additional feature which cuts across other discrete categories of ambiguity and do not believe it warrants an independent category of its own. Others view it as a stand alone category but define it in different ways, assigning it different values and sub values. It was decided in the current context that phonological ambiguity be treated as a stand alone category. This was because of the high percentage of riddles in contemporary circulation which involve the manipulation of sounds (see Section 5.2 for full definition of phonological ambiguity). This is reflected in the responses of listeners who, perceive and communicate it thus:

Figure 2: Explaining phonological ambiguity

How did the banana know he was ill? Because he wasn't peeling well	
Year 2	`'Well it's cos bananas get peeled and they don't feel well'`
Year 4	`'Well because um you can peel a banana and um they they've kind of changed the 'f' to a 'p' so it sounds like he wasn't `<u>`peeling`</u>` well instead of he wasn't feeling well.'`
Year 6	`'Because like peeling rhymes with feeling.  It's just one letter away and like you peel a banana to eat it.'`

These explanations, coupled with the definition of phonological ambiguity as provided in Section 5.2, reflect the way(s) in which phonological ambiguity is realised, perceived and communicated by listeners. They show it to occur when sounds are modified – specifically phonemes - and exclude other linguistic phenomena previously included within this categorisation such as the modification of word boundaries (Shultz & Pilon, 1973; Shultz & Horibe, 1974) and the concept of homophony (Shultz & Pilon, 1973; Shultz & Horibe, 1974; Binstead & Ritchie, 1997; Green & Pepicello, 1979, 1984). By isolating the specific language features constituting phonological ambiguity in this way, the future researcher can now be sure both of the linguistic phenomena constituting phonological ambiguity and of the processing demands required in order that it be understood.

3.3 *Morphological ambiguity*
Morphological ambiguity, though less frequently tested in studies on children's humour comprehension than lexical and phonological ambiguities, nonetheless proliferates in children's verbal riddles. It arises from differences in the perception of word boundaries and occurs when a listener perceives units of sounds in a different way from that originally intended by the speaker. For example, in the riddle:

 'What bird is low in spirits?'
'A bluebird'.

the original reading of 'bluebird' is taken to mean 'a small North American bird that is mostly blue'. In order to make sense of this incongruous answer however an alternative reading needs to be accessed. This alternative reading can only be accessed by rearranging word boundaries so that 'bluebird' is instead interpreted as 'blue bird' meaning a 'sad bird'.

There are many riddles which deliberately exploit the potential for this type of mis-parsing. They present the listener with context(s) containing groups of sounds that can be arranged in different ways to allow for alternative morphological interpretations. This type of ambiguity is best delivered orally since the written form is likely to bias one interpretation over another.

Morphological ambiguity has previously been treated as a stand alone category of ambiguity by Pepicello (1980) and Pepicello and Green (1984). It has been used by Hirsh-Pasek et al. (1978) and Yuill (1998) to research children's humour comprehension although they term it 'morpheme boundary' and 'word compound' ambiguity respectively. Other researchers choose not to refer to morphological ambiguity but still discuss the phenomena it embodies by relating it to different classes of ambiguity altogether (Shultz and Pilon, 1973; Lew, 1996a).

For Hirsh-Pasek et al (1978: 116) morphological ambiguity occurs 'when a polysyllable can be interpreted as a single morpheme or as a sequence of morphemes'. This is in keeping with elements of Pepicello's (1989) and Green and Pepicello's (1984) interpretation of morphological ambiguity which they subdivide into four sub categories, some of which involve the rearrangement of word boundaries ('What bow can no one ever tie?' 'A rainbow') and some of which do not ('What's black and white and red/read all over?' 'A newspaper'). Pepicello claims that the latter riddle exemplifies morphological ambiguity on the basis that 'the verb *read* plus its past participle morpheme are homophonous with the simple adjective *red*' (Pepicello, 1989: 208). The focus on irregular inflectional morphology does not in any way allude to the rearrangement of word boundaries however - unlike the other three sub categories he provides.

It can thus be seen that, much like lexical and phonological ambiguity types, morphological ambiguity has been interpreted in a variety of different ways both within and across studies. It is treated as a stand alone category by some but not by others and the phenomena it involves has sometimes been included in different categories of ambiguity altogether. In the current context morphological ambiguity is treated as a stand alone category. It is viewed as involving the manipulation of word boundaries but does not involve the modification of phonemes (see Section 5.3 for full definition of morphological ambiguity). This interpretation is supported by the explanations of listeners which show that morphological ambiguity is isolated, identified and communicated thus:

Figure 3: Explaining morphological ambiguity

Why couldn't the skeleton go to the ball? Because he had **no body/nobody** to go with	
Year 2	`'It's because a skeleton doesn't have any body and he doesn't have anybody to go with either.... didn't have any bodies, any lungs, leg, ribcage but there's doesn't have a head.'`

Year 4	`'Because like no body cos he has no body like skeletons and he has no friends to go with.'`
Year 6	`'Because normally when you say someone doesn't um have anybody to go with it means like they don't have like a partner to go with but the reason it would probably it would be a joke is because skeletons don't have bodies so the literally they couldn't go with a body'.`

Such explanations, together with the definition for morphological ambiguity provided below, validate the interpretation of morphological ambiguity as presented in Section 5.3. They isolate the specific language feature(s) through which this ambiguity type is realised and both accommodate and communicate it as occurring when word boundaries are altered and/or modified to elicit humour. This not only allows for the elimination of potential confusion with ambiguities based upon phoneme modification (as in the study of Shultz & Pilon, 1973) and homophones (as in the study of Pepicello, 1989), but also enables the researcher to be sure of the linguistic features - and the requisite processing demands - that specifically comprise this ambiguity type.

3.4 *Syntactic ambiguity*
Syntactic ambiguity has frequently been used to test comprehension in studies on children's humour development, but much like the other ambiguity types discussed thus far, under differing guises and labels. This type of ambiguity lies not in individual lexical items but in the ways in which entire phrases, clauses or sentences are structurally perceived. It occurs when two sentences look the same (by virtue of identical word order) but can be interpreted in different ways depending upon the syntactic representations perceived by the listener.

Given the tight link between lexicon and syntax, syntactic ambiguity nearly always involves a certain degree of lexical ambiguity. This is perhaps inevitable given that individual lexical items carry the semantic information required for different syntactic constructions. There is a notable difference between lexical and syntactical ambiguity, however. Words, and meanings dependent upon lexical ambiguity have identical syntactical representations whereas words and meanings dependent upon syntactic ambiguity do not. In order to be syntactically ambiguous then, a word needs not only to contain two or more meanings, but two or more different grammatical interpretations.

Syntactic ambiguity has historically been broken down into various sub categories. For Shultz and Pilon (1973), Shultz (1974), Shultz and Horibe (1974), Fowles and Glanz (1977), Brodinsky (1977) and Zipke (2007) the major two sub categories comprise '*surface structure ambiguity*' and '*deep structure ambiguity*'. Hirsh-Pasek et al. (1978) use the former term and also refer to '*underlying structure*' ambiguity. Green and Pepicello (1979) allude to '*syntactic*' processes and discuss this concept further in a subsequent paper (1984). Yuill (1998) also makes reference to '*syntactic*' ambiguity although she provides us with no definition of what this might comprise. Lew (1996a,

1997) is more specific and discusses jokes dependent upon this type of ambiguity as *'syntactic function'* and *'syntactic class'* jokes. Others prefer to discuss the phenomena this type of ambiguity embodies under the heading of *'structural ambiguity'* (Oaks, 1994; Dubinsky and Holcomb, 2011) and provide further sub categories of their own.

Although there is variation in the terminology used to discuss syntactic ambiguity, it is nonetheless generally agreed that it comprises two major sub divisions. These two sub divisions are most commonly, though not exclusively, referred to as 'surface structure ambiguity' and 'deep structure ambiguity', and relate to structures put forward by Chomsky (1965) in his theory of transformational grammar. Of these two types, it is that which occurs most frequently in contemporary riddles and which is often referred to as 'deep structure' or 'class' ambiguity, that is analysed here.

Both Crystal (2008) and Hirsh-Pasek et al. (1978) make direct reference to the transformational nature of deep structure ambiguity. The former labels this ambiguity type 'transformational ambiguity' (Crystal, 2008: 22) whilst the latter describes it as occurring 'when a single sequence of words has two transformational sources, or two case labelings, identifying different sentential meanings' (Hirsh-Pasek et al., 1978:116). Hirsh-Pasek et al. (1978), Shultz and Pilon (1973), Fowles and Glanz (1977), Brodinsky (1977) and Zipke (2007) all interpret this ambiguity type in a similar way with Brodinsky (1977: 961) referring to riddles dependent upon this type of ambiguity as being worded in such a way that they 'have more than one underlying logical relation'. Lew (1997: 6), however, opts to give this type of ambiguity his own label – that of 'syntactic class' ambiguity. He explains that jokes based on this type of ambiguity 'exhibit two readings corresponding to two different syntactic representations, within which a fragment of the text may be assigned two different syntactic class structures, and this fact underlies the difference in the two readings'. Oaks (1994: 378) also makes use of the term 'class ambiguity' (citing Stageberg) and refers to what he terms 'ambiguity enablers' which help exploit this type of ambiguity. He justifies his use of the term 'class' because 'this type of ambiguity gets its name because it creates a confusion between the traditional classes or parts of speech (such as nouns, verbs, adjectives, and so forth)' (Oaks, 1994: 378). For example:

'How was the blind carpenter able to see?'
'He picked up his hammer and *saw.'*

Here, the ambiguity lies in the lexical item 'saw' but it is more than a simple case of lexical ambiguity relying upon the homonymous interpretation of the word 'saw' meaning 'tool for cutting' and 'was able to see'. At a deeper level syntactic ambiguity arises from the fact that the word 'saw' can be interpreted as either comprising a noun (the former) or a past tense verb form (the latter). In this light, syntactic ambiguity is interpreted in the current context as occurring when there is a change in word class for the two different readings of an ambiguous word (see Section 5.4 for full definition of syntactic ambiguity). That this is a soundly based definition is reflected in the explanations of listeners' for this particular ambiguity type:

Figure 4: Explaining syntactic ambiguity

Why do leopards make rubbish thieves? Because they're always **spotted**	
Year 2	'Cos leopards have spots ... and spotting someth-like spotting something and stuff ... just looking at finding something.'
Year 4	'Um well because um they're spotted as spotted as you can see them you got spotted and then there's um spotted as you're like you got spots on and um and they're spotted so um that's why I think it's funny.'
Year 6	'Because if you're spotted it means that someone's seen you and also leopards are spotted ... they've got spots on them.'

The above explanations not only support the current interpretation of syntactic ambiguity as defined in Section 5.4, but also demonstrate how it affords listeners the opportunity to identify, process and communicate understanding of this ambiguity type as being manifested through homophony/polysemy coupled with a change of word class. This interpretation contrasts with the way in which syntactic ambiguity has been interpreted in earlier studies such as that of Yuill (1998) where it is reduced to instances of lexical ambiguity without acknowledging the additional level of grammatical processing it requires to be understood.[6] By accommodating the fact that this syntactic ambiguity occurs at more than one level of language (lexical and syntactical) the current definition now reflects the additional processing demands that are required in order that a single word, comprising two different meanings and constituting two different word classes, be comprehended.

3.5 *Idiomatic ambiguity*

A cursory glance at children's riddles in contemporary joke books will reveal that many of them contain some form of idiomatic ambiguity in their punchlines. This type of ambiguity relies upon the conventionalised figurative meaning of an idiom being confused with the literal meanings of its individual lexical components for its humour. Because an idiom constitutes a phrase whose meaning cannot be determined from its individual component parts, this type of ambiguity demands a specific type of linguistic knowledge. A listener needs to be able to recognize both literal and idiomatic senses of a conventualised fixed expression. For example, in the following riddle:

'How much did the pirate pay for his peg leg and sharp hook?'
'An arm and a leg.'

the listener needs not only to know that a peg leg and a sharp hook are traditionally recognised as being substitutes for the missing limbs,- legs and arms (for pirates in

particular) - but that the fixed phrase 'an arm and a leg' means 'a substantial amount of money' in idiomatic English.

Although there are a substantial number of riddles which rely upon idiomatic ambiguity, this ambiguity type has received little discussion as a distinct category of its own in the past. Green and Pepicello (1984) list this type of language phenomenon as being syntactic whereas Binstead and Ritchie (1997: 33) claim it to be phonological if it involves a 'confused word [which] is often part of a common phrase'. Lew (1996a, 1997) on the other hand views idiomatic ambiguity as occurring in what he terms 'lexical jokes'. He includes idiomatic ambiguity in the sub category 'lexicalization of a larger unit (lexico-syntactic)' and refers to it as involving the 'decomposition of idioms' (Lew 1997:4). Likewise, Partington (2006: 119) categorises this type of ambiguity as a form of 'relexicalisation' describing it as 'one of the fundamental linguistic process [sic] underlying many forms of phraseplay'. He describes relexicalisation as including all types of semi pre constructed phrases 'of practically any sort, from proverbs and sayings to quotations, idioms, even simple common collocations' (Partington, 2006: 119).

Whilst researchers often fail to address the issue of idiomatic competence, they nonetheless include stimuli reliant upon this ambiguity type in their studies. For example, Fowles and Glanz (1977: 446) include riddles reliant upon idiomatic phenomena in the category of lexical ambiguity ('Why didn't the skeleton cross the road?' 'It didn't have the guts') whereas Shultz and Pilon (1973: 730) treat ambiguous sentences of this nature as being phonologically ambiguous ('He stepped over the lion/line').

Although riddles dependent upon idiomatic ambiguity have been included in other categories in previous studies, it was decided in the current context to give idiomatic ambiguity independent classification. This is because idiomatic ambiguity depends on a very specific type of knowledge, one that is different from the focus of the other types of ambiguity discussed thus far and which tests a different type of cognitive processing (see Section 5.5 for full definition of idiomatic ambiguity). This is reflected in the responses of listeners who explain idiomatic ambiguity thus:

Figure 5: Explaining idiomatic ambiguity

Why did the schoolboy eat his homework? Because his teacher said it was **a piece of cake**	
Year 2	'Um because sometimes people say it's a piece of cake when something's easy ... and he thought it was actually cake.'
Year 4	'Because some it's like a saying sort of like um when you've or if you're saying it's easy you say it's a piece of cake but then he must of thought that it was actually a real piece of cake.'

Year 6	`'Cos when people say um it's a piece of cake some people say it's easy but the boy was a bit silly and he took it literally and he it because he thought it was something you eat.'`

Such explanations reinforce the present interpretation of idiomatic ambiguity as occurring when the literal meanings of individual words are confused with the sum of their fixed idiomatic meaning. Hence, unlike earlier studies in which this type of linguistic wordplay has been categorised as constituting lexical or phonological ambiguity (see discussion above), the definition presented in Section 5.5 reflects the fact that idiomatic ambiguity depends upon groups of words carrying a collective meaning not identifiable from the sum of its individual parts. It accommodates the fact that, as well as an understanding of figurative language, idiomatic ambiguity requires more advanced processing skills in order that it might be understood.

4 Interactive ambiguity

As can be seen from the discussion above, discrete types of ambiguity have been defined in varying ways by previous researchers and interpretations of discrete ambiguity types have often 'overlapped' in terms of the linguistic phenomena they are seen to embody. This issue has no doubt been compounded by the fact that different types of ambiguity often operate simultaneously in order to provide an incongruous punchline. For example:

'What happened to the snake with a cold?'
'She *adder viper* nose'.

In the above example there is more than one type of ambiguity at work. The punchline (riddle answer) thus relies upon multiple interdependent ambiguity for its humour. Phonological ambiguity (in terms of phoneme substitution), morphological ambiguity (in terms of differing word boundaries) and syntactical ambiguity (in terms of words assigned different syntactical classes) all interplay to provide two different readings of the riddle text. This type of ambiguity interplay is discussed in some detail by Aarons (2012: 149) - who terms it 'multicategoriality' - and also by Binstead and Ritchie (1997) and Lew (1996a).

Although several types of ambiguity often operate simultaneously in this way, Binstead and Ritchie (1997: 31) claim it to be 'relatively straightforward to divide the bulk of question answer riddles according to the primary level of ambiguity they use'. This is not always true, however, and is often subjective. The present investigation has therefore attempted to isolate each ambiguity type in order that the researcher can be sure that each type - and the linguistic phenomena it embodies - actually tests that which it purports to test. Although this matter has frequently been overlooked in previous studies, it is of huge importance. Different linguistic phenomena require different types of cognitive application and this may well have a significant bearing on outcomes. One therefore needs to be sure that one really is testing the linguistic phenomena one professes to test, in order that results be considered valid. The five definitions below

directly address this matter and are designed for use in future studies on children's developing understanding of verbal humour.

5 Definitions of ambiguity types for testing children's humour development

5.1 *Lexical ambiguity definition*
Lexical ambiguity occurs solely within the alternative meaning of an individual lexical item and does not rely upon grammatical analysis at phrase/clause/sentence level. It occurs when a singular word has more than one meaning without any class violation. This type of ambiguity encompasses both homonyms and polysemes since when relayed orally, both carry the same sound but different meanings.

Example: Why are babies good at football? Because they can *dribble*.

5.2 *Phonological ambiguity definition*
Phonological ambiguity occurs when the ambiguous fragment of riddle text has two non identical phonetic forms for the two alternative interpretations. The modification of the phonetic form can comprise the addition, deletion or substitution of a phoneme. It does not involve modification of phonetic form across word boundaries and is contained within a single lexical item.

Example: What do whales eat for dinner? Fish and *sh*ips.

5.3 *Morphological ambiguity definition*
Morphological ambiguity occurs when there are changes in morpheme boundaries for the two readings of the text. Other than variation in stress or juncture, the ambiguous fragment of the riddle has identical phonetic forms for the two alternative interpretations.

Example: Why did the jelly wobble? Because it saw the *milkshake/milk shake*.

5.4 *Syntactic ambiguity definition*
Syntactic ambiguity occurs when two different underlying syntactic structures are mapped onto a single surface structure. The two different syntactic representations reflect different underlying grammatical relations between lexical items. Syntactic ambiguity relies upon grammatical analysis at whole phrase, clause or sentence level.

Example: How was the blind carpenter able to see? He picked up his hammer and *saw*.

5.5 **Idiomatic ambiguity definition**
Idiomatic ambiguity occurs when the figurative meaning of an idiom is confused with the literal meanings of its individual lexical components.

Example: What does Spiderman do when he's angry? He *goes up the wall.*

6 Conclusion
The present paper has highlighted the fact that ambiguity classifications have varied in previous studies on children's humour comprehension and has demonstrated how

published umbrella terms have historically been interpreted and applied in widely varying ways by researchers. It has shown how the same linguistic phenomena have been classified as comprising different ambiguity types and how different phenomena have been classified as comprising the same type of ambiguity. This lack of consistency in classification(s) makes it difficult to compare findings across studies. It has also led to claims being made about different ambiguity types children are able to comprehend at different developmental stages when in fact the linguistic phenomena contained within stimuli do not actually relate to ambiguity type purportedly tested, nor to the processing skills they claim to test. This in turn casts doubts upon the validity of claims made in earlier studies (e.g. Shultz and Pilon 1973, report that children find phonological ambiguities easiest to detect even though some of the stimuli they use to test this ambiguity type depend upon homophony and the shifting of word boundaries rather than upon sound distortion(s) and the manipulation of phonemes).

In order that identifiable trends in children's ambiguity comprehension might be validated more readily, there needs to be more precision regarding the language phenomena each ambiguity type constitutes. The present investigation has addressed this issue by providing definitions for five types of ambiguity: lexical, phonological, morphological, syntactic and idiomatic. Each definition is based upon linguistic phenomena through which the ambiguity is realised (i.e. upon the language through which it is delivered). Potential overlap in linguistic phenomena has been eliminated as much as possible to allow the future researcher to be sure of the ambiguity type, the linguistic phenomena and the cognitive processes being tested at any given time. The application of these definitions in studies on children's humour development should now allow for findings to be compared more readily across studies in future which, in turn, might lead to a more comprehensive body of knowledge within the field of children's humour development than has been possible thus far.

In addition to furthering theoretical advancement thus, application of definitions in future research might also facilitate future practical implementation within the classroom. As earlier noted, humour is a valuable resource (fun, engaging and motivational) through which to develop creative thinking skills and ambiguity based humour in particular can be used to develop children's literacy skills. In order to fully exploit this resource, however, we need to know more about the facility with which different ambiguity types are comprehended at different developmental stages. This knowledge will only be acquired through consistent application of systemic, rigorous, linguistically based ambiguity definitions - such as those that form the basis of the current paper - across future studies.

Endnotes

[1] Although it should be noted that Attardo et al. include in this category ambiguities that contain 'phonetic difference' in addition to 'identical phonetic construction'.

[2] Although claims have been made regarding differences in storage, access and processing of homonyms and polysemes as multiple and single entries respectively in the mental lexicon (Beretta, Fiorentino & Poeppel 2005, Klepousniotou, 2002; Klepousniotou & Baum, 2007; Klepousniotou, Pike, Steinhauer & Gracco. 2012), reported findings are for adults rather than for children (who form the basis of the majority of studies on humour development)

[3] Data is taken from a study on children's understanding of ambiguity-based verbal riddles (████ 2017). A single explanation is provided for a child from each participating Year Group (Year 2 – aged 6-7, Year 4 – aged 8-9), Year 6 aged 10-11). Explanations were randomly selected but typical of the group

[4] Participants did not always possess the requisite metalanguage with which to define ambiguities but were nonetheless able to communicate understanding of linguistic phenomena upon ambiguities were based through a range of verbal and non-verbal strategies (communicative strategies can be found in ██████ 2017).

[5] Although Yuill does use a category which she terms 'morphophonological'.

[6] Yuill (1998:327) treats the riddle 'Why do leopards never escape from the zoo?' 'Because they're always spotted' as constituting lexical ambiguity despite 'spotted' having to be interpreted as 'seen' (passive verb) and 'spotty' (adjective) in order to comprehend the humour.

References

Aarons, Debra. 2012. *Jokes and the linguistic mind*. New York: Routledge

Attardo, Salvatore, Donalee Hughes Attardo, Paul Baltes & Marnie Jo Petray. 1994. The linear organization of jokes: Analysis of two thousand texts. *Humor: International Journal of Humor Research* 7 (1). 27--54

██
███████████████████████████████

Bariaud, Francoise. 1989. Age differences in children's humor. *Journal of Children in Contemporary Society* 21 (112). 15-45

Ben-Amos, Dan. 1976. Solutions to riddles. *Journal of American Folklore* 89 (352). 249--254

Beretta, Alan, Robert Fiorentino & David Poeppel. 2005. The effects of homonymy and polysemy on lexical access: An MEG study. *Cognitive Brain Research* 24. 57--65

Binstead, Kim & Graeme Ritchie. 1997. Computational rules for generating punning riddles. *Humor: International Journal of Humor Research* 10 (1). 25--76

Blake, Barry. 2007. *Playing with words: Humour in the English language*. London: Equinox Publishing Ltd

Brodinsky, David. 1977. Children's comprehension and appreciation of verbal jokes in relation to conceptual tempo. *Child Development* 48. 960--967

Chiaro, Delia. 1992. *The language of jokes: Analysing verbal play*. London: Routledge

Chomsky, Noam. 1965. *Aspects of the theory of syntax*. Cambridge, Massachusetts: MIT Press

Crystal, David (ed.). 2008. *A dictionary of linguistics and phonetics,* 6th edn. Oxford: Blackwell Publishing Ltd.

Dienhart, John. 1999. A linguistic look at riddles. *Journal of Pragmatics* 31. 95--125

Dubinsky, Stanley & Chris Holcomb. 2011. *Understanding language through humour*. New York: Cambridge University Press

Fowles, Barbara & Marcia Glanz. 1977. Competence and talent in verbal riddle comprehension. *Journel of Child Language* 4 (3). 433--452

Green, Thomas & William Pepicello. 1979. The folk riddle: A redefinition of terms. *Western Folklore* 38 (1). 3--20

Green, Thomas & William Pepicello. 1984. The riddle process. *Journal of American Folklore,* 97 (384). 189--203

Hirsh-Pasek, Kathy, Lila Glietman & Henry Gleitman. 1978. What did the brain say to the mind? A study of the detection and report of ambiguity by young children. In Sinclair, Anne, Robert Jarvella & Willem Levelt (eds), *The child's conception of language*, 97--132. Berlin: SpringerVerlag

Klepousniotou, Ekaterini. 2002. The processing of lexical ambiguity: homonymy and polysemy in the mental lexicon. *Brain and Language* 81. 205--223

Klepousniotou, Ekaterini & Shari Baum. 2007. Disambiguating the ambiguity effect in word recognition: An advantage for polysemous but not homonymous words. *Journal of Neurolinguistics* 20. 1--24

Klepousniotou, Ekaterini, Bruce Pike, Karsten Steinhauer & Vincent Gracco. 2012. Not all ambiguous words are created equal: An EEG investigation of homonymy and polysemy. *Brain and Language* 123. 11--21

Lew, Robert. 1996a. An ambiguity-based theory of the linguistic verbal joke in English. Unpublished Phd thesis https://www.researchgate.net/publication/49250266_An_ambiguity-based_theory_of_the_linguistic_verbal_joke_in_English (last accessed 26 March 2019)

Lew, Robert. 1996b. Ambiguity-generating devices in linguistic verbal jokes. http//works.bepress.com/robert_lew/27 (last accessed 26 March 2019)

Lew, Robert. 1997. Towards a taxonomy of linguistic jokes. *Studia Anglica Posnaniensia: International Review of English Studies.* http://www.thefreelibrary.com/Towards+a+taxonomy+of+linguistic+jokes.+(1).-a092683475 (last accessed 26 March 2019)

McGhee, Paul. 1977. A model of the origins and early development of incongruity-based humour. In Chapman, Antony & Hugh Foot (eds), *It's a funny thing humour.* 27--36. Oxford: Pergamon Press

McGhee, Paul. 1979. *Humor. Its origin and development.* San Francisco: W. H. Freeman & Company

McGhee, Paul. 2002. *Understanding and Promoting the development of children's humour.* Iowa: Kendall/Hunt Publishing Company

Oaks, Dallin. 1994. Creating structural ambiguities in humor: Getting English grammar to cooperate. *Humor: International Journal of Humor Research* 7 (4). 377--401

Partington, Alan. 2006. *The linguistics of laughter.* New York: Routledge

Pepicello, William. 1980. Linguistic strategies in riddling. *Western Folklore* 39 (1). 1--16

Pepicello, William. 1989. Ambiguity in verbal and visual Riddles. *Humor: International Journal of Humor Research* 2 (3). 207--215

Pepicello, William & Thomas Green. 1984. *The language of riddles.* Ohio: Ohio State University Press

Shultz, Thomas. 1974. Development of the appreciation of riddles. *Child Development* 45. 100--105

Shultz, Thomas & Frances Horibe. (1974). Development of the appreciation of verbal jokes. In *Developmental Psychology* 10 (1). 13--20

Shultz, Thomas & Robert Pilon. 1973. Development of the ability to detect linguistic ambiguity. In *Child Development* 44. 728--733

Wolftstein, Martha. 1954. *Children's humor: A psychological analysis.* Bloomington: Indiana University Press

Yuill, Nicola. 1998. Reading and riddling: The role of riddle appreciation in understanding and improving poor text comprehension in children. *Current Psychology of Cognition* 17 (2). 313--342

Yuill, Nicola & Jane Oakhill. 1991. *Children's problems in Text comprehension: An experimental investigation.* Cambridge: Cambridge University Press.

Zipke, Marcy. 2007. The role of metalinguistic awareness in the reading comprehension of sixth and seventh graders. *Reading Psychology* 28 (4). 375--396

Zipke, Marcy. 2008. Teaching metalinguistic awareness and reading comprehension with riddles. *The Reading Teacher* 62 (2). 128--137

Zipke, Marcy. 2009. Using semantic ambiguity instruction to improve third graders' metalinguistic awareness and reading comprehension: An experimental study. *Reading Research Quarterly* 44 (3). 300--321.

Ziv, Avner. 1976. Facilitating effects of humor on creativity. *Journal of Educational Psychology* 68 (3). 318--322

Ziv, Avner. 1983. The influence of humorous atmosphere on divergent thinking. *Contemporary Educational Psychology* 8. 68--75

Ziv, Avner. 1988. Using humor to develop creative thinking. *Journal of Children in Contemporary Society* 1--2. 99--116