



# THE UNIVERSITY *of* EDINBURGH

## Edinburgh Research Explorer

### Contextual influences on children's spoken and written explanations

**Citation for published version:**

Donaldson, M 1996, 'Contextual influences on children's spoken and written explanations' Applied Psycholinguistics, vol. 17, pp. 355-375. DOI: 10.1017/S0142716400007980

**Digital Object Identifier (DOI):**

[10.1017/S0142716400007980](https://doi.org/10.1017/S0142716400007980)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Publisher's PDF, also known as Version of record

**Published In:**

Applied Psycholinguistics

**Publisher Rights Statement:**

© Donaldson, M. (1996). Contextual influences on children's spoken and written explanations. Applied Psycholinguistics, 17, 355-375 doi: 10.1017/S0142716400007980

**General rights**

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

**Take down policy**

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



# Contextual influences on children's spoken and written explanations

MORAG L. DONALDSON  
*University of Edinburgh*

## ADDRESS FOR CORRESPONDENCE

Dr. M. L. Donaldson, Department of Psychology, University of Edinburgh, 7 George Square, Edinburgh, UK EH8 9JZ

## ABSTRACT

The relative influences of medium and context variables were investigated by comparing 7- and 8-year-old children's spoken and written explanations in varying contexts: a story task, a question task, a sentence completion task, and a whole sentence production task. In the story task, performance in a "purpose" condition (which provided a specific communicative purpose for the production of an explanation) was compared with performance in a "neutral" condition. The frequency of explanations containing correct causal expressions was significantly higher in the purpose condition than in the neutral condition and significantly lower in the story task than in the three more structured tasks. In contrast to these contextual influences, performance in the written medium was very similar to performance in the spoken medium.

Among the abilities that children possess when they start formal schooling at around age 5 is the ability to explain. They are able to give spoken explanations of events and actions, and they are able to make the causal links in their explanations explicit by using causal expressions (such as *because* and *so*) appropriately (Donaldson, 1986; Donaldson & Elliot, 1990; French & Nelson, 1985; Hood & Bloom, 1979). The ability to explain is a powerful intellectual tool, especially in view of the central role that explanation plays in education. By giving an explanation (perhaps in response to a question from a teacher), children can display their understanding of a phenomenon, and by seeking and understanding explanations from other people, they can extend their knowledge and understanding. Research on children's narratives (e.g., Bamberg & Damrad-Frye, 1991) has highlighted the importance of Labov and Waletzky's distinction (1967) between narrative clauses, which report events in sequential order, and evaluating clauses, which indicate how the narrator views the events and the relationships between events. Evaluating clauses signal the point of the narrative. Explanations constitute one important type of evaluating clause. The ability to relate an event or action to its cause and to express these causal relationships by using causal connectives is a major component of the ability to produce coherent, cohesive discourse – an ability which, in turn, is particularly crucial to the task of becoming a competent writer.

However, teachers sometimes comment that young children's written compositions typically consist of lists of sentences, which are either simply juxtaposed or strung together by *and*; more specific connectives such as *because* are conspicuous by their virtual absence. Research evidence, although rather limited in this area, confirms teachers' reports by indicating that causal connectives are rare in writing produced by children even as old as 10 years (Perera, 1984; Raban, 1988; Yde & Spoelders, 1985).

A related observation is that children's written narratives tend to consist of descriptions of events in chronological order and tend to be lacking in explanations of why the events occurred or how they relate to one another. Bereiter and Scardamalia (1987) proposed that novice writers use a knowledge-telling model of composition, which involves retrieving items of content from memory, including them in the composition in the order in which they were retrieved, and expressing them in whatever linguistic forms come most readily to hand.

Thus, it appears that, long after children have developed the ability to express causal relations in their speech, they fail to use this ability in their writing. Why is this so? There are many possible explanations, but two main categories can be distinguished: "medium" explanations propose that children's ability to handle the spoken medium is superior to their ability to handle the written medium, whereas "context" explanations propose that the apparent differences in performance between speech and writing are actually attributable to differences between the contexts in which speech and writing are typically produced. These two types of explanation will be referred to as the medium hypothesis and the context hypothesis, respectively. The study reported in this article aims to test specific versions of the medium and context hypotheses in relation to 7- and 8-year-olds' production of explanations and causal expressions. The rationale for each of the hypotheses will now be considered.

Because novice writers are in the process of mastering many new skills (such as handwriting and spelling), it would not be surprising if the linguistic repertoire which they are able to draw on in writing were more limited than that which they can draw on in speech, as predicted by the medium hypothesis. There are various reasons why this might be so. It could be that children avoid writing words they have not yet learned to spell, or that they limit the cognitive demands of a writing task by using only simple vocabulary and grammatical constructions. Kroll (1981) proposed that one of the early stages of writing development is a "consolidation" phase in which the linguistic abilities that the child has already developed in the spoken medium are gradually extended to the written medium. According to Perera (1984), the consolidation phase typically occurs between 6 and 9 years of age, although this will, of course, vary from child to child. As Kroll pointed out, the age at which consolidation takes place is also likely to vary from one aspect of language to another.

In learning to write, children have to cope not only with a new medium of expression, but also with a different communicative context from the one they are likely to be most familiar with in spoken communication. The

prototypical context for the production of speech is two or more people engaging in a conversation, whereas for writing it is one person engaging in a monologue. Bereiter and Scardamalia (1987) described some of the problems faced by children in making the transition from conversation to composition and attributed many of these problems to the difficulty of sustaining a monologue without the support that, in spoken discourse, would be provided by the interaction with a conversational partner. This contextual support often includes various prompts (such as questions) that may cue the child in to expressing particular types of semantic content and to using particular linguistic constructions. For instance, *why* questions may prompt the production of explanations and causal expressions. The conversational context may also provide the speaker with a purpose for producing a particular utterance. For example, an interlocutor's surprise, disbelief, or puzzlement may prompt the speaker to offer an explanation. According to the context hypothesis, it is children's difficulty in producing language in the absence of such prompts that is responsible for apparent discrepancies in performance between speech and writing. In particular, one version of the context hypothesis, which will be highlighted in this article, predicts that the paucity of explanations and causal connectives in children's writing is due to their being unable or unwilling to express causal links, unless they are prompted to do so by features of the linguistic or nonlinguistic context.

One implication of the context hypothesis is that explanations and causal connectives will occur infrequently, not only in children's written narratives, but also in their spoken narratives in monologue contexts. This is consistent with findings from several studies, which indicated that the spoken narratives produced by children between the ages of 5 and 9 years tend to be characterized by sequential lists of events and a low frequency of causal connectives (Bamberg & Damrad-Frye, 1991; Geva & Olson, 1983; Hicks, 1990).

Medium and context variables are confounded in most of the available evidence on children's ability to explain and use causal connectives: prompts are more likely to have been provided in the contexts used for collecting spoken data than in those used for collecting written data. Hood and Bloom (1979) collected their data on spoken uses of causal connectives in conversational contexts involving mother-child interactions. In most of Donaldson's (1986) studies of spoken explanations, the children were asked either to answer *why* questions or to complete sentence fragments that ended in *because* or *so* (e.g., *The cup broke because . . .*). These tasks mimic a conversational context by providing children with prompts that are likely to influence the content and form of their response. In contrast, writing tasks are typically less structured in the sense that they require children to produce extended text without being prompted "on-line."

A study of spoken narratives conducted by Stenning and Michell (1985) is one of the few studies that did not confound medium and context variables. These researchers manipulated the context variable within one medium (speech) by asking children both to tell stories and to answer questions about causal links. While very few 7-year-olds produced explanatory

narratives in the storytelling task, many more of them produced explanations when asked questions about the causal links underlying their stories. Thus, the findings provide support for the context hypothesis. However, Stenning and Michell's study did not explore the effects of the medium variable.

Conversely, a study by Cameron, Hunt, and Linton (1988) manipulated only the medium variable by comparing 7-year-old children's spoken and written reproductions of stories, although it did not investigate causal expressions specifically. The findings do not lend much support to the medium hypothesis in that, overall, the similarities between the spoken and written stories were more notable than the differences. However, Cameron et al. did find that children more frequently chained clauses together with *and* or *and then* in their spoken stories than in their written stories. This is consistent with Chafe's argument (1985) that the chaining of independent clauses is more characteristic of spoken language than written language, which is instead characterized by a greater use of more complex linking devices such as subordinating conjunctions (including *because* and *so that*). Although Chafe's argument is related to the medium hypothesis, in the sense that it predicted differences between speech and writing, it makes the opposite prediction about the direction of the difference in frequency of causal connectives to that being advanced here. Because Cameron et al.'s study did not provide any data on the frequency of causal connectives, it is not possible to evaluate this specific aspect of Chafe's argument.

The aim of the present study was to separate out medium and context variables by using similar contexts to elicit both spoken and written explanations (so that the two media could be compared, with context held constant) and by using a range of elicitation contexts within each medium (so that different contexts could be compared, with medium held constant). It is recognized, though, that the medium and context hypotheses need not be mutually exclusive. Indeed, it is likely that both types of variable play a role, and that their relative contributions vary developmentally. Of course many types of contextual variables may influence children's speech and writing. This study was designed to investigate the effect of two specific types of contextual manipulation: (a) whether or not the social context provided a purpose for the production of explanations, and (b) the extent to which the linguistic context prompted the production of explanations.

The task used in this study was adapted from one used by Donaldson (1986) to investigate children's ability to handle explanations in the intentional mode. These are explanations in which an action is explained in terms of the agent's intention to achieve a particular effect (e.g., *John threw a ball because he wanted to break the window*). They can be contrasted with empirical mode explanations in which an event is explained in terms of another, temporally prior, event or state (e.g., *The window broke because John threw a ball at it*) or with deductive mode explanations in which a conclusion is explained by reference to supportive evidence (e.g., *We can tell that the window broke because there is broken glass lying on the ground*). Donaldson (1986) found that 5-year-olds had considerable ability

to handle explanations in the empirical and intentional modes, but that they had difficulty with deductive mode explanations, as indeed did many 8-year-olds. In their observational study of 2- to 3-year-old children's spontaneous speech, Hood and Bloom (1979) found that the contexts where causal connectives most frequently occurred involved explanations that referred to intentions. Similarly, what Donaldson referred to as intentional mode explanations were the most prevalent explanations produced in McCabe and Peterson's (1985) study in which 3- to 9-year-old children were asked to recount personal experiences to the researcher. Thus, there is reason to suppose that intentional mode explanations will be salient to 7- to 8-year-olds, and that producing such explanations will be well within their capabilities, at least as far as spoken language is concerned.

## METHOD

### *Subjects*

There were 64 subjects in total, with 32 in each of two age groups. The children in the 7-year-old group were in Primary 3 (equivalent to Grade 2), and their ages ranged from 7;3 to 8;3, with a mean age of 7;9. This group comprised 18 girls and 14 boys. The children in the 8-year-old group were in Primary 4 (equivalent to Grade 3), and their ages ranged from 8;3 to 9;2, with a mean age of 8;9. There were 16 girls and 16 boys in this group. The children were all pupils at a Local Authority primary school, and they came from a variety of socioeconomic backgrounds.

### *Design*

The study was designed to investigate how children's production of explanations is influenced by four variables:

1. the *medium* of language production (spoken vs. written);
2. the *linguistic context* (comparing four tasks which differed in the extent to which they prompted the production of explanations);
3. the *social context* (the presence vs. absence of a clear communicative purpose for the production of an explanation);
4. the children's *age* (7 years vs. 8 years).

Medium and linguistic context were within-subjects variables, whereas social context and age were between-subjects variables.

The medium and linguistic context variables were manipulated by presenting each child with a set of four spoken tasks and a set of four written tasks: a story task, a question task, a sentence completion task, and a whole sentence task. The written and spoken versions of the tasks were designed to be as similar to each other as possible, apart from the difference in medium. Half of the children (in each age group) received the spoken set of tasks first, while the other half received the written set first. The four tasks

in each set varied in the degree to which they prompted or constrained the child to produce explanations and causal expressions, with the prompts and constraints being least in the story task and greatest in the sentence completion task.

For each set of tasks, the children were presented with a pair of drawings depicting an action (e.g., John putting a mouse in Mary's bed) and its effect (e.g., Mary getting a fright). Two pairs of drawings were used, and each child received one pair for the spoken tasks and the other pair for the written tasks, with the allocation of drawings to tasks being counterbalanced across subjects.

The social context manipulation applied only to the story task, which involved asking the children to tell (or write) a story about the pictures. In order to manipulate the communicative demands of the task, half of the subjects in each age group were randomly assigned to a "purpose" condition and the other half to a "neutral" condition. In other words, 16 7-year-olds and 16 8-year-olds received the purpose condition, while the remaining 16 children in each age group received the neutral condition. For each child, the context condition was the same for both the spoken and the written story tasks. The purpose condition was designed to create a context that would cue children in to the communicative importance of producing explanations and causal connectives. In this condition, the experimenter presented the children with an audience for their stories by showing them a photograph of another child who was looking at a drawing of an action (e.g., John putting a mouse in Mary's bed), but who was described as being puzzled about the reason for the action because he or she had not seen the other drawing (e.g., of Mary getting a fright). The children who received the neutral condition were also presented with an audience in the form of a photograph of another child, but they were simply told that the audience had not seen either of the drawings.

### *Materials*

The stimulus materials included two pairs of colored drawings: each pair depicted an action and its effect. The two drawings in the pair were arranged vertically on a page, with the drawing of the action at the top. For pair A, the action drawing showed John putting a mouse in Mary's bed, and the effect drawing showed Mary getting a fright. For pair B, the action drawing showed Mary laying a trail of dog biscuits into her bedroom, and the effect drawing showed the dog going into Mary's bedroom. In previous research (Donaldson, 1986), these drawings were found to provide a successful means of eliciting explanations in the intentional mode.

Corresponding to each pair of pictures, a set of verbal stimulus materials was generated consisting of a question item (e.g., *Why did John put a mouse in Mary's bed?*) and three sentence completion items ending with *because*, *so that*, or *so* (e.g., *John put a mouse in Mary's bed because/so that . . . ; John wanted to give Mary a fright so . . .*). For the written tasks, each item was presented on a separate slip of lined paper and was typed in

large print at the top of the slip. The slips of paper also included several blank lines on which the children were asked to write their responses (in pencil). Blank sheets of lined paper were used for the children to write their responses to the written story task and the whole sentence items.

Six color photographs showing children of an age similar to the subjects were used to depict an audience for the subjects' stories. The three photographs that were used for female subjects showed a girl (Susan), and the three that were used for male subjects showed a boy (Simon). Within each of these two sets of photographs, two photographs (used in the purpose condition) showed the child looking at the action drawings. In these photographs, the page containing the drawing had been torn in half, and only the half showing the action drawing remained. The other photograph (used in the neutral condition) did not include any drawings and simply showed the child looking straight ahead.

A videorecorder was used to record the sessions for later analysis. In addition, responses to the spoken task were recorded on audiocassette via a large, free-standing microphone which was placed on a desk immediately in front of the child.

### *Procedure*

The children were tested individually in a spare classroom in their school. They received both the spoken and the written sets of tasks in a single testing session lasting approximately 30 minutes. The sessions were videorecorded, and responses to the spoken tasks were also recorded on audiocassette.

Each set of tasks began with a warm-up procedure in which the experimenter showed the children one of the pairs of drawings, introduced the characters as John and Mary, and asked the children, "What is happening in the pictures?" This was done to check that the children were able to interpret the pictures appropriately. Where necessary, the experimenter asked more specific questions about particular parts of the pictures and gave descriptions of any parts of the pictures that were unclear to the children. The drawings remained in front of the children throughout the tasks.

The story task involved asking the children to tell (or write) a story about the pictures. For the children in the purpose condition, the experimenter presented a photograph of another child called Susan (or Simon, if the subject was a boy) looking at a drawing of an action (e.g., John putting a mouse in Mary's bed). The experimenter pointed out that Susan was looking at one of the same drawings as the subjects were looking at, but that Susan had seen only one of the drawings from the pair because someone had torn her picture book. In order to stress the importance of giving an explanation of the action, the experimenter said that Susan was wondering why John had put a mouse in Mary's bed. The children were asked to tell (or write) a story to help Susan understand this. They were asked to pretend



that their stories would be sent to Susan and to make their stories as interesting as they could so that Susan would enjoy them.

In the neutral condition, the children were shown a photograph of Susan (or Simon) in which she was not looking at any drawings. The children were told that Susan had not seen the pictures, and that she liked listening to (or reading) stories. The experimenter invited the children to help by telling or writing Susan a story about the pictures. As in the purpose condition, the children were asked to pretend that their stories would be sent to Susan and to make their stories as interesting as they could so that Susan would enjoy them.

In both conditions, when the children appeared to have finished speaking or writing, the experimenter asked whether there was anything else they could put in their story, because previous research has suggested that such prompts often prove useful with children of the age studied here (Bereiter & Scardamalia, 1987).

The question task was carried out immediately after the story task. It involved asking the children to answer a *why* question about the action depicted in the drawings (e.g., *Why did John put a mouse in Mary's bed?*). In the spoken version of the task, the experimenter asked the question, and the child had to give a spoken response. In the written version, the experimenter gave the child a slip of paper with the question written on it and asked the child to write an answer onto the slip.

The sentence completion and whole sentence tasks were administered at the end of the testing sessions, with each whole sentence item being presented immediately after the corresponding sentence completion item. For the sentence completion task, each child received three items of the form:

ACTION *because* . . . (e.g., *John put a mouse in Mary's bed because* . . .)

ACTION *so that* . . . (e.g., *John put a mouse in Mary's bed so that* . . .)

DESIRE *so* . . . (e.g., *John wanted to give Mary a fright so* . . .)

The *so* item was always presented last because it contained a reference to an intention and hence might have biased the children toward producing intentional mode explanations in their earlier responses. The order of presentation of the other two sentence completion items was counterbalanced. Again, the items were presented and responded to either in the spoken or the written medium, depending on the version of the task being administered. In the written version, each item was written on a separate slip of paper so that the three items could be presented sequentially (as in the spoken version). In both versions of the task, after the children had completed a sentence, they were asked to produce the whole sentence by themselves. Before asking the children to do this in the written task, the experimenter replaced the slip containing the completion response with a blank slip on which the children were asked to write the whole sentence.

### *Predictions*

The children's performance was assessed in terms of the frequency of uses of explanations and causal connectives. The medium hypothesis predicted

that performance would be better on the spoken task than on the written task. The context hypothesis predicted, first, that for the story task the purpose condition would elicit better performance than the neutral condition, and, second, that performance would be better in the contexts that provide linguistic prompts (the question and sentence completion tasks, as opposed to the story task). Tasks that provided linguistic prompts required the children to produce only part of the causal construction; the experimenter produced the first clause in the question task and both the first clause and the connective in the sentence completion task. The whole sentence task was therefore included in order to explore children's ability to produce complete causal sentences in a context involving linguistic prompts. It was predicted that performance would be better in the whole sentence task than in the story task. If children have difficulty in producing complete causal sentences, then they might be expected to perform less well on the whole sentence task than on the sentence completion task.

## RESULTS

### *Coding and analysis of data*

The children's responses were transcribed into typewritten form (with spelling errors edited out), and a code number was randomly assigned to each transcript so that, in carrying out the analysis, the researcher would be blind as to whether the responses had been produced in the purpose or neutral condition and whether they had been written or spoken.

The first step in analyzing the stories was to identify those parts that referred to the action (e.g., *John put a mouse in Mary's bed*) or the effect (e.g., *Mary got a fright*) depicted in the drawings or to a reason for the action (e.g., *John wanted to give Mary a fright*). All subsequent analyses of the story data reported here are concerned only with these parts of the stories. (There was, in fact, considerable variation in the length of the stories produced and the extent to which the children elaborated on the material presented in the pictures.)

Responses to the story and whole sentence tasks were categorized according to the elements of the reason-action-effect sequence to which they referred. Similarly, responses to the question and sentence completion tasks were coded according to whether they referred to a reason, an effect, or neither.

The children's uses of causal expressions were coded as correct or incorrect. In cases where a child used a causal expression in an inappropriate way, it was usually difficult to be certain which elements of the reason-action-effect sequence the child was referring to, so in reporting the results of the analysis described here, all responses involving incorrect uses of causal expressions were assigned to a separate "error" category.

In the intentional mode, sentences in which the causal constructions are used correctly can be divided into four main types:

1. *because* sentences: the first clause describes an action, and the second clause describes a reason for the action by referring to the agent's desire to achieve an effect (e.g., *John put a mouse in Mary's bed because he wanted to give her a fright*).
2. *so that* sentences (from which the *that* may be omitted): the first clause describes an action, and the second clause describes a reason for the action by using a modal verb to refer to the predicted effect of the action (e.g., *John put a mouse in Mary's bed so that she would get a fright*).
3. *so* sentences (where *so* is being used in the sense of "therefore"): the first clause describes a reason for an action by referring to the agent's desire to achieve an effect, and the second clause describes the action (e.g., *John wanted to give Mary a fright so he put a mouse in her bed*).
4. (*for*) *to* sentences: the description of the action is followed by an infinitive construction, which expresses the desired effect (e.g., *Mary is putting a trail of dog biscuits for Rover to follow*).

Errors could occur in several ways: the child could select the wrong connective (e.g., *John put a mouse in Mary's bed because she would get a fright*) or could describe the effect that the reason anticipated instead of the reason itself (e.g., *John put a mouse in Mary's bed because he gave her a fright*).

For the whole sentence items, the use of a causal expression was counted as correct as long as the sentence was correct in itself, even if the child used a causal connective other than the one used by the experimenter in the sentence completion item. The frequency of such connective changes was also noted. The sentence completion responses were coded according to whether the child completed the sentence in a way that yielded a correct causal sentence - although in this case, the researcher supplied the causal connective, and it was the child's task to supply an appropriate second clause to match the connective and the first clause.

Responses to the story, question, and whole sentence tasks were subcategorized according to the type of causal expression that the child used. This analysis was based on the four types of causal expression outlined here (and the corresponding constructions in the empirical mode), with the addition of an "other" category to cover other types of causal expressions such as causative verbs (e.g., *She led the dog up to her room with the biscuits*).

The results of the analyses were combined to determine the number of responses in which the relation between the action and the reason was explicitly marked with a correctly used causal expression.

#### Story task data

As Table 1 shows, almost all the stories referred to the target action and at least one other element of the sequence. The stories assigned to the action + reason [effect] category were those in which the only reference to the effect was embedded in a reference to the reason: for example: *John put the mouse in Mary's bed because he wanted to scare her*. In other words,

Table 1. *Categorization of stories according to the elements of the reason-action-effect sequence to which they refer*

Response pattern	Frequency	Percentage
Action + Reason + Effect	42	33
Action + Reason [Effect]	20	16
Action + Effect	52	41
Action	1	1
Effect	5	4
None	3	2
Errors	5	4

Table 2. *Frequency distribution across conditions of action + reason responses with correct causal marking in the story task*

	Purpose	Neutral	Total
<b>Spoken Task</b>			
7 years	7	4	11
8 years	12	7	19
Total	19	11	30
<b>Written Task</b>			
7 years	7	4	11
8 years	11	4	15
Total	18	8	26

such responses involved explanations in the intentional mode. All except two of the responses in the action + reason + effect category were also in the intentional mode. Overall, 49% of the total responses to the story tasks referred to a reason for the action, as shown in rows 1 and 2 of Table 1.

When the children provided an explanation for the action, they usually made this explicit by using an appropriate causal expression: out of the 62 action-reason relations, 56 (i.e., 90%) were marked with the correct use of a causal expression. Subsequent analyses will focus mainly on the action-reason relations with correct causal marking in order to facilitate comparisons with the sentence completion task data (which inevitably involved causal expressions). In fact, the picture that emerges from considering the total set of action-reason responses is very similar because (1) the percentage of correctly marked causal relations was so high, and (2) both sets of responses showed essentially the same pattern of distribution across the medium and context conditions.

Table 2 shows how the responses expressing action-reason relations with correct causal marking were distributed across conditions. Performance was better for the 8-year-old children than for the 7-year-old children, but

this difference was significant only for the spoken condition,  $\chi^2 = 3.08$ ,  $p < .05$ , and not the written condition. The frequency of causally marked explanations was significantly higher in the purpose condition than in the neutral condition, both for the spoken data,  $\chi^2 = 3.08$ ,  $p < .05$ , and for the written data,  $\chi^2 = 5.25$ ,  $p < .05$ . However, there was no significant difference in performance between the spoken and written tasks. Thus, the findings from the story task provide support for the context hypothesis, but not for the medium hypothesis; for both speech and writing, the children were more likely to express action-reason relations with correct causal marking when they were prompted by the context, which provided them with a purpose for producing an explanation. However, even in the purpose condition, a substantial proportion (42%) of the stories did not include a correct causal sentence explaining the action.

#### *Comparisons between story task data and data from the more constrained tasks*

The *so* completion items were intended to elicit causal sentences of the form:

reason (= desire) *so* action

e.g., *John wanted to give Mary a fright so he put a mouse in her bed.*

However, only 20% of the spoken responses and 9% of the written responses to *so* completion items were of this form. Instead, these items usually elicited sentences of the form:

desire *so* reason (= predicted effect)

e.g., *John wanted to give Mary a fright so he could laugh at her.*

While such responses are perfectly acceptable in their own right (and include a reference to a purpose), they do not express a relation between an action and a reason, and hence they are not comparable with the responses to the other tasks. Therefore, the data from the *so* completion and whole sentence tasks were excluded from the statistical analyses.

The 8-year-olds produced significantly more correct causal sentences in the spoken story task than did the 7-year-olds. A similar age effect was obtained for the spoken *because* sentence completion items,  $\chi^2 = 5.81$ ,  $p < .01$ , one-tailed. Overall, though, the performance of the two age groups was very similar, as Table 3 shows.

The context hypothesis predicted that children would produce more correct causal sentences when they were prompted with a *why* question or with a causal connective than they would in the story task. The results presented in Table 3 confirm this prediction. McNemar tests (one-tailed) revealed that, for both the spoken and the written medium, correct causal responses to the story task were significantly fewer ( $p < .0005$ ) than those to the question task ( $\chi^2 = 14.67$ , for spoken version;  $\chi^2 = 21.81$ , for written version); the *because* completion task ( $\chi^2 = 17.63$ , for spoken version;  $\chi^2 = 11.43$ , for written version); and the *so that* completion task ( $\chi^2 = 12.90$ ,

Table 3. *Correct causal sentences expressing action–reason relations by task, medium, and age: As frequencies and as percentages of possible responses per cell*

	Spoken Task			Written Task		
	7 years	8 years	Total	7 years	8 years	Total
Story	11 (34%)	19 (59%)	30 (47%)	11 (34%)	15 (47%)	26 (41%)
Question	27 (84%)	26 (81%)	53 (83%)	25 (78%)	28 (88%)	53 (83%)
<i>Because</i> completion	23 (72%)	31 (97%)	54 (84%)	22 (69%)	25 (78%)	47 (73%)
<i>So that</i> completion	24 (75%)	27 (84%)	51 (80%)	22 (69%)	27 (84%)	49 (77%)
<i>Because</i> whole	27 (84%)	31 (97%)	58 (91%)	25 (78%)	25 (78%)	50 (78%)
<i>So that</i> whole	24 (75%)	26 (81%)	50 (78%)	24 (75%)	20 (62%)	44 (69%)

for spoken version;  $\chi^2 = 13.83$ , for written version). Furthermore, the children produced significantly more correct causal sentences in the whole sentence tasks than in the story task (spoken *because*:  $\chi^2 = 21.44$ ,  $p < .0005$ ; written *because*:  $\chi^2 = 16.53$ ,  $p < .0005$ ; spoken *so that*:  $\chi^2 = 12.89$ ,  $p < .0005$ ; written *so that*:  $\chi^2 = 8.028$ ,  $p < .005$ ). Performance in the whole sentence tasks did not differ significantly from performance in the corresponding sentence completion tasks.

The medium hypothesis predicted that correct causal sentences would be more frequent in the spoken than in the written condition, but the findings provided only very limited support for this hypothesis. For the *because* whole sentence task, there were significantly more correct causal responses in the spoken condition than in the written condition, McNemar  $\chi^2 = 3.063$ ,  $p < .05$ , one-tailed. However, there were no significant differences in performance between the spoken and written versions of any of the other tasks.

One possible interpretation of the finding that correct causal sentences are more frequent for the question and completion tasks than for the story task would be that the more constrained tasks elicited more *correct* causal sentences simply by virtue of the fact that they elicited more causal sentences in total. The results presented in Table 4 indicate that, although the question tasks encouraged the children to produce more causal responses than the story task, this did not involve any decrease in the percentage correct. On the other hand, the proportion of correct responses was lower in the completion tasks than in the story and question tasks, especially for the written versions. Thus, it appears that the children made more errors when they were constrained to using a particular type of linguistic construction. Nevertheless, even in the sentence completion tasks, the proportion of correct responses was considerably higher than the proportion of errors.

In the whole sentence tasks, the children sometimes used a connective other than the one used by the experimenter in the original sentence completion item. For example, one child completed the item, *Mary put down some dog biscuits because . . .* with . . . *she was wanting the dog to go in her room*, but then produced a whole sentence with a *so that* construction:

Table 4. *Correct causal sentences (expressing action-reason relations) as percent of total causal sentences per task*

	Total causal sentences	% correct
<b>Spoken Task</b>		
Story	33	91%
Question	55	96%
<i>Because</i> completion	63	86%
<i>So that</i> completion	61	84%
<i>Because</i> whole sentence	63	92%
<i>So that</i> whole sentence	61	82%
<b>Written Task</b>		
Story	28	93%
Question	57	93%
<i>Because</i> completion	64	73%
<i>So that</i> completion	64	77%
<i>Because</i> whole sentence	50	86%
<i>So that</i> whole sentence	44	80%

*Mary put dog biscuits down so that the dog would go in her room.* In arriving at the data presented in Tables 3 and 4, whole sentence responses were counted as correct as long as the sentences were correct in themselves, even if they involved changes of connective. Indeed, such changes are interesting in that they indicate that the children were not simply mimicking the first clause and connective as produced by the researcher, but had formed an internal representation of the sentence's underlying semantic structure and were able to express this with an appropriate linguistic form. Overall, 31% of the correct whole sentence responses involved a change in the connective. As one might expect, connective changes were more frequent in the spoken condition (36%) than in the written condition (24%), perhaps because written language has a more permanent quality, which encourages attention to surface form. There was a slight tendency for *so that* sentences to be changed more frequently than *because* sentences (35% compared with 27%). However, the frequency of connective changes was similar for the two age groups (31% for the 7-year-olds and 30% for the 8-year-olds).

#### *Different types of causal expressions*

In the story and question tasks, the children could choose the type of causal expression they used. As Table 5 shows, the children's use of causal sentences in the story task was distributed fairly evenly across *because*, *so (that)*, and *(for) to* constructions. However, in the question task, the use of *because* and *(for) to* constructions was more frequent than the use of *so (that)* constructions. Since the error rates were so low, it was not possible to discern any differences among construction types in the accuracy with

Table 5. Frequency of correct and incorrect responses involving each type of causal expression

	Correct	Incorrect	Total
<b>Story</b>			
<i>because</i>	15	4	19
<i>so (that)</i>	17	1	18
<i>so</i> ("therefore")	6	0	6
<i>(for) to</i>	17	0	17
other	1	0	1
<b>Question</b>			
<i>because</i>	47	2	49
<i>so (that)</i>	14	4	18
<i>so</i> ("therefore")	0	0	0
<i>(for) to</i>	41	0	41
other	4	0	4
<b>Whole Sentence</b>			
<i>because</i>	94	21	115
<i>so (that)</i>	86	19	105
<i>so</i> ("therefore")	13	1	14
<i>(for) to</i>	38	1	39
other	5	1	6

which they were produced. However, as Table 5 shows, even in the sentence completion task, which yielded a higher error rate, there were no clear differences in accuracy between *because* and *so that* items.

### Errors

In view of the low occurrence of errors, it was not considered appropriate to attempt to categorize them into different types. The following examples give some indication of the nature of the errors.

#### Story task

*John is putting the mouse in Mary's bed because Mary's got a fright.*

*Mary is putting dog biscuits because she is making her dog come into her room.*

#### Question task

*(Why did Mary put down some dog biscuits?) So that the dog came into her room.*

*(Why did John put a mouse in Mary's bed?) So she gets a fright.*

#### Sentence completion task

*(John put a mouse in Mary's bed because . . .) she would get a fright.*

*(John put a mouse in Mary's bed so that . . .) she got a fright.*

*(Mary put down some dog biscuits because . . .) to follow.*

*(Mary put down some dog biscuits so that . . .) it ate them all up.*



Whole sentence task

*John put a mouse in Mary's bed because he frightened her.*

*Mary put down dog biscuits so that the dog can follow them.*

As these examples illustrate, it was not always clear whether the source of the child's difficulty was the causal connective per se or other properties of the construction, such as tense/modality. If anything, the error rates were likely to overestimate the children's difficulties in using causal constructions, because ambiguous cases as well as clear errors were assigned to the error category.

## DISCUSSION

By manipulating context and medium variables independently, this study provided evidence that suggests that the failure of 7- and 8-year-old children to express causal links in their writing has more to do with contextual factors than with their difficulties in handling the written medium per se. In other words, the findings provide support for the context hypothesis, but very little support for the medium hypothesis. Of course, it may well be that a different picture would emerge if slightly younger children with less experience of writing were studied, but it is interesting that, even for children as young as 7 years of age, the effects of the medium were not evident.

The context hypothesis is supported in two ways. First, the children produced more explanations involving the correct use of causal expressions in the purpose condition than in the neutral condition of the story task. Creating a context which highlighted the communicative purpose of an explanation encouraged more children to include explanations in their stories. Second, correctly marked causal explanations were more frequent in the more constrained tasks, which provided linguistic prompts (the question and sentence completion tasks), than in the story task. Because the frequency of correctly marked causal explanations did not differ significantly between the sentence completion task and the whole sentence task, it appears that the children did not experience much difficulty in producing complete causal sentences. Furthermore, the fact that they sometimes produced a different form of causal sentence implies that they were not simply mimicking the sentence that they had previously constructed jointly with the experimenter.

Support for the context hypothesis is consonant with the emphasis that is placed on contextual factors by many researchers in developmental psychology and child language. Although it is now a truism that context is important, much remains to be established about the precise nature and theoretical significance of contextual influences. Several researchers have argued that variations in children's performance from one context to another can be informative about the nature of developmental change and developmental mechanisms. For instance, Vygotsky's (1978) theory emphasized the importance of social interaction between children and adults (or more competent peers). By collaborating with more expert members of the cul-

ture, the child is enabled to accomplish tasks that he or she could not accomplish unaided – tasks that fall within the child's zone of proximal development. Bruner (1986) used the metaphor of scaffolding to describe the ways in which adults help children within their zone of proximal development. Adults provide support (for example, by directing the child's attention to relevant features of a task) that enables children to climb up in small steps from the level at which they could succeed unaided. The prompts provided in this study are, in effect, a form of scaffolding; they were designed to mimic the type of help which children might receive from adults in conversational contexts when explanations are being jointly constructed. Vygotsky's and Bruner's theoretical perspectives would imply that such prompts not only enable children to succeed in particular contexts, but also provide a mechanism for developmental progression toward more autonomous production of connected discourse.

Margaret Donaldson (1978, 1992) also stressed the influence of contextual factors on early thinking and language, which she regarded as being informative about the nature of developmental change. She argued that development entails an increasing ability to think in ways that go beyond one's own immediate personal concerns and goals and in ways in which thought is detached (where appropriate) from perception, action, and emotion. The difference between the purpose and neutral conditions in this study can be regarded as a specific example of Margaret Donaldson's (1978) distinction between embedded and disembedded tasks. The task used in the purpose condition is embedded in a context that provides the child with a specific purpose in giving an explanation – namely, to help another child to understand a picture. A critical educational issue is how children can best be helped to make the transition from one type of task to the other.

Contextual variations in children's performance on linguistic tasks also have implications regarding the nature of linguistic ability. Snow (1991) argued against the traditional view that language proficiency is unitary, and that contextual variations in performance should be regarded as uninteresting "noise." Instead, she proposed that language proficiency should be envisaged as componential. Different competencies are required to meet the demand characteristics of different linguistic tasks, and these competencies may develop at different rates from one another and show individual variation across children. In order to understand the nature of linguistic ability, it is therefore necessary to collect language data from a variety of contexts and analyze the effect of the context and the task on performance. A similar argument was advanced by Donaldson and Laing (1993) in discussing developmental relationships between comprehension and production abilities. The present findings imply that different competencies are involved in producing causal expressions in prompted and unprompted contexts, and that development entails extending the competencies developed in prompted contexts to unprompted contexts. Kroll (1981) argued that, in learning to write, children need to consolidate the linguistic skills that they have already developed in the spoken medium. However, the present results highlight the importance of another type of consolidation – one in which the linguistic

skills that have been developed in particular communicative contexts (such as conversations) are extended to more demanding contexts (such as monologues). It is likely that such consolidation plays an essential role not only in the development of written language, but also in the development of spoken language.

Although it is possible to separate out medium and context variables, as in this study, in everyday situations, the two types of variables are usually interdependent. Written language is usually more explicit, autonomous, and context-independent than spoken language (Olson, 1977; Tannen, 1985). Acquiring the ability to cope with these features of written language is a crucial part of learning to write, and it has been argued that this ability has far-reaching effects on the development of thinking (Donaldson, 1978; Olson, 1977). Thus, the finding that children's performance in this study was influenced more by the context than by the medium should not in any sense be taken to imply that their difficulties were superficial or irrelevant to the task of learning to write. In order to become skilled writers, children have to learn to make their texts coherent and cohesive by using linguistic devices such as causal expressions, even when they are not explicitly prompted to do so. What the present findings suggest is that prompts (such as those provided in the purpose condition and in the question and sentence completion tasks) might serve as effective stepping stones to the development of a coherent writing style. This hypothesis could be tested in future research by using a training study to investigate whether giving children the experience of writing in contexts involving prompts will improve their ability to produce coherent written texts in less supportive contexts. The findings from the whole sentence task are promising in this respect because they indicate that the effects of the prompts provided in the sentence completion task can carry over to a less constrained task, albeit within a very restricted timescale.

The effectiveness of the purpose manipulation in this study indicates that at least some of the children were influenced by audience characteristics in both their speech and their writing. Most previous research into children's ability to adapt their communication to the audience's state of knowledge has investigated the effect of the amount of knowledge attributed to the audience (e.g., Menig-Peterson, 1975; Perner & Leekam, 1986). In contrast, the audience variable in this study was more concerned with the type of knowledge required by the audience. The audience in the neutral condition had not seen either of the drawings; therefore they actually knew less than the audience in the purpose condition, but it was the audience in the purpose condition who had a specific need for an explanation. The type of contextual prompt employed in the purpose condition could readily be adapted for use in the classroom. In addition to encouraging children to include explanations and causal expressions in their spoken and written discourse, it would also help children appreciate the importance of adapting their discourse to the needs of the intended audience.

A criticism that is sometimes leveled at traditional classroom writing assignments is that they typically do not provide children with either an

audience or a communicative purpose. Therefore, such assignments are artificial, compared with children's everyday conversational interactions and with many of the writing tasks they will encounter outside the classroom and in later life. In the present study, the contextual differences between the neutral and purpose conditions were quite conservative compared with those between traditional classroom writing assignments and everyday communication. Even in the neutral condition, the children were provided with an audience who had a need to be informed, and so their story production served some general communicative purpose. The purpose condition provided children with a more specific communicative purpose, but the situation was still quite artificial and contrived. Nevertheless, significant differences in linguistic performance were obtained, even between two contexts that are relatively close together on the neutral-purpose continuum. This highlights the importance of contextual variables relating to audiences and communicative purposes and suggests that even more dramatic effects might be achieved if more naturalistic contextual manipulations were used, both by researchers and by teachers.

The finding that most of the children in the neutral condition did not mention the story character's intention is broadly consistent with previous findings on children's narratives. Geva and Olson (1983) found that, when 6-year-olds were asked to retell stories, only 14% inserted motives. Cameron et al. (1988) obtained similar results for 7-year-olds' spoken and written reproductions of stories. Similarly, when Yussen (1982) asked subjects to write and tell stories about sets of pictures, he found that the stories produced by second and seventh grade children, unlike those produced by adult subjects, tended to lack any references to the characters' motives, goals, or feelings. Yussen suggested that this may be due to "a lack of interest in or understanding of motivation and connectivity, a reportorial need to stay close to the 'pictorial text,' or a simplification of events as a way of handling too much cognitive complexity" (p. 277).

The first of these explanations seems implausible. There is evidence to suggest that human purposes play a central role in young children's thinking (Donaldson, 1978). In addition, evidence from research on children's theory of mind indicates that, by age 4, children can handle a variety of complex reasoning tasks involving representational states such as intentions and beliefs (Astington & Gopnik, 1991). Indeed, Wellman (1990) found that even 3-year-olds are able to explain actions by referring to beliefs and desires when they are prompted to do so. Yussen's other two proposals imply that it should be possible to encourage children to refer to intentions by altering the way the storytelling task is presented. The present findings demonstrate that this is indeed the case and, moreover, that one reasonably successful technique for encouraging children to explain an action with a purpose is to create a context that gives them a purpose for providing an explanation. Ultimately, though, children will need to develop the ability to include motives in their stories, even when they are not specifically prompted to do so. Geva and Olson (1983) suggested that learning to make such information explicit is an aspect of the acquisition of literate uses of

language. Support for this argument comes from their finding of a positive relation between children's reading comprehension abilities and their tendency to include motives in oral narratives, although the causal direction of this relation is unclear.

It is evident that 7- and 8-year-old children have the ability to produce explanations and mark these appropriately with causal expressions not only in their speech, but also in their writing. However, many of the children used causal explanations only when they were prompted to do so by either linguistic cues or a context that provided a specific purpose for the explanation. An important theoretical and educational issue for future research to address is how children could best be helped to extend their explanatory abilities from more structured to less structured contexts.

### ACKNOWLEDGMENTS

The author wishes to thank the pupils, staff, and parents from Cockenzie Primary School, East Lothian, for their cooperation with this study. Thanks are also expressed to Margaret Donaldson, Robert Grieve, Jennifer Reid, and two anonymous reviewers for their helpful comments on earlier versions of this article.

### REFERENCES

- Astington, J. W., & Gopnik, A. (1991). Theoretical explanations of children's understanding of the mind. *British Journal of Developmental Psychology*, 9, 7-31.
- Bamberg, M., & Damrad-Frye, R. (1991). On the ability to provide evaluative comments: further explorations of children's narrative competencies. *Journal of Child Language*, 18, 689-710.
- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, NJ: Erlbaum.
- Bruner, J. S. (1986). *Actual minds: Possible worlds*. Cambridge, MA: Harvard University Press.
- Cameron, C. A., Hunt, A. K., & Linton, M. J. (1988). Medium effects on children's story rewriting and story retelling. *First Language*, 8, 3-18.
- Chafe, W. L. (1985). Linguistic differences produced by differences between speaking and writing. In D. R. Olson, N. Torrance, & A. Hildyard (Eds.), *Literacy, language and learning* (pp. 105-123). Cambridge: Cambridge University Press.
- Donaldson, M. (1978). *Children's minds*. London: Fontana.
- (1992). *Human minds*. London: Penguin.
- Donaldson, M. L. (1986). *Children's explanations: A psycholinguistic study*. Cambridge: Cambridge University Press.
- Donaldson, M. L., & Elliot, A. (1990). Children's explanations. In R. Grieve & M. Hughes (Eds.), *Understanding children* (pp. 26-50). Oxford: Basil Blackwell.
- Donaldson, M. L., & Laing, K. (1993). Children's comprehension and production of locative expressions. In D. J. Messer & G. J. Turner (Eds.), *Critical influences on child language acquisition and development* (pp. 159-178). London: Macmillan.
- French, L. A., & Nelson, K. (1985). *Young children's knowledge of relational terms*. New York: Springer.
- Geva, E., & Olson, D. (1983). Children's story-retelling. *First Language*, 4, 85-110.
- Hicks, D. (1990). Narrative skills and genre knowledge: Ways of telling in the primary school grades. *Applied Psycholinguistics*, 11, 83-104.
- Hood, L., & Bloom, L. (1979). What, when and how about why: A longitudinal study of early expressions of causality. *Monographs of the Society for Research in Child Development*, 44 (n6, Serial No. 181).
- Kroll, B. M. (1981). Developmental relationships between speaking and writing. In B. M.

- Kroll & R. J. Vann (Eds.), *Exploring speaking-writing relationships* (pp. 32-54). Urbana, IL: National Council of Teachers of English.
- Labov, W., & Waletzky, J. (1967). Narrative analysis: oral versions of personal experience. In J. Helm (Ed.), *Essays on the verbal and visual arts* (pp. 12-44). Seattle: University of Washington Press.
- McCabe, A., & Peterson, C. (1985). A naturalistic study of the production of causal connectives by children. *Journal of Child Language*, 12, 145-159.
- Menig-Peterson, C. L. (1975). The modification of communicative behaviour in preschool-aged children as a function of the listener's perspective. *Child Development*, 46, 1015-1018.
- Olson, D. R. (1977). From utterance to text: the bias of language in speech and writing. *Harvard Educational Review*, 47, 257-281.
- Perera, K. (1984). *Children's writing and reading: Analysing classroom language*. Oxford: Basil Blackwell.
- Perner, J., & Leekam, S. R. (1986). Belief and quantity: Three-year olds' adaptation to listener's knowledge. *Journal of Child Language*, 13, 305-316.
- Raban, B. (1988). Speaking and writing: Young children's use of connectives. *Child Language Teaching and Therapy*, 4, 13-25.
- Snow, C. E. (1991). Diverse conversational contexts for the acquisition of various language skills. In J. Miller (Ed.), *Research on child language disorders: A decade of progress* (pp. 105-124). Austin, TX: Pro-Ed.
- Stenning, K., & Michell, L. (1985). Learning how to tell a good story: The development of content and language in children's telling of one tale. *Discourse Processes*, 8, 261-279.
- Tannen, D. (1985). Relative focus on involvement in oral and written discourse. In D. R. Olson, N. Torrance, & A. Hildyard (Eds.), *Literacy, language and learning* (pp. 124-147). Cambridge: Cambridge University Press.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Wellman, H. M. (1990). *The child's theory of mind*. Cambridge, MA: MIT Press.
- Yde, P., & Spoelers, M. (1985). Text cohesion: An exploratory study with beginning writers. *Applied Psycholinguistics*, 6, 407-416.
- Yussen, S. R. (1982). Children's impressions of coherence in narratives. In B. A. Huston (Ed.), *Advances in reading/language research*, (Vol. 1, pp. 245-281). Greenwich, CT: JAI Press.