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**Stewart, A. J., Haigh, M., & Ferguson, H. J. (2013). Sensitivity to speaker control in the online comprehension of conditional tips and promises: an eye tracking study. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 39, 1022-1036.**

Sensitivity to speaker control in the online comprehension of conditional tips and promises: an eye-tracking study.

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Abstract

Statements of the form *if...then....* can be used to communicate conditional speech acts such as tips and promises. Conditional promises require the speaker to have perceived control over the outcome event while conditional tips do not. In an eye-tracking study we examined whether readers are sensitive to information about perceived speaker control during processing of conditionals embedded in context. On a number of eye-tracking measures we found that readers are sensitive to whether or not the speaker of a conditional has perceived control over the consequent event; conditional promises (which require the speaker to have perceived control over the consequent) result in processing disruption for contexts where this control is absent. Conditional tips (which do not require perceived control) are processed equivalently easily regardless of context. These results suggest that readers rapidly utilise pragmatic information related to perceived control in order to represent conditional speech acts as they are read.

### Introduction

Conditionals of the form *if...then...* have been widely studied within the fields of reasoning and decision making (e.g., Evans, 2008; Johnson-Laird & Byrne, 2002). However, examination of how conditionals are understood during language processing has received much less focus (but see de Vega, Urrutia, & Rizzo, 2007; Ferguson & Sanford, 2008; Nieuwland, in press; Nieuwland & Martin, 2012; Stewart, Haigh, & Kidd, 2009). Conditionals pose an interesting set of problems from a language processing perspective as their successful comprehension requires a number of levels of pragmatic and semantic analyses. These include those related to grammatical mood (Stewart et al., 2009), the speech act com

-Rousseau, & Ketelaar, 2004, 2006), the conditional probability of a conditional (Haigh, Stewart, & Connell, in press; Oberauer & Wilhelm, 2003) and the extent to which readers are sensitive to the degree of (mis)match between the utility of the consequent clause of a conditional and the utility which a reader is likely to have anticipated based on prior context (Haigh, Ferguson & Stewart, under review). Specifically, Haigh et al (under review) report eye-tracking data which suggests that conditionals describing a negative outcome, but embedded in contexts in which readers should anticipate a positive outcome results in a rapid disruption to eye movements. These findings reveal some of the many levels of analysis the language processing system may have to engage in order to arrive at a full interpretation of the meaning conveyed by a conditional statement. In the experiment reported below we go beyond the scope of these papers to focus on how the properties of a speaker may influence the online processing of conditional speech acts.

Imagine a situation involving a graduate student in Physics presenting their work at a scientific conference. Now imagine that after their presentation a senior colleague comes up to them and utters “*If you submit your research to the Journal of Physics, then I will publish it in the next issue.*” This utterance is likely to be interpreted by the student as approximating a conditional promise if the senior academic is the journal Editor who thus has control over what work gets published in the journal and the student knows this (Evans, 2005). However, if the same utterance had been produced by a fellow graduate student (who does not have perceived control over what is published in the Journal of Physics), the utterance would be considered infelicitous. This is because conditional promises require the speaker to have perceived control over the consequent event (Evans & Twyman-Musgrove, 1998). However, advice in the form of a conditional tip (e.g., *If you submit your research to the Journal of Physics, then it stands a good chance of being published*) does not require the speaker to have perceived control over the outcome event (i.e., the research paper being published in the journal).

Conditional promises and tips are examples of implicit speech acts (Searle, 1969). As they lack the performative verb (cf., *If you submit your research to the Journal of Physics, then I promise I will be publish it in the next issue*), readers must utilise the broader pragmatic context, in this case the perception of speaker control, in order to arrive at the appropriate speech act interpretation (Bonneton, 2009; Evans, Neilens, Handley, & Over, 2008; Evans & Twyman-Musgrove, 1998; López-Rousseau & Ketelaar, 2004, 2006).

Currently we do not know whether readers rapidly represent conditional speech act information as conditionals are processed. Indeed, there has been relatively little

research into whether speech act information (more generally) forms a part of readers' online comprehension. Some notable exceptions include research by Holtgraves (2008a, 2008b). In a series of lexical decision and probe task experiments Holtgraves (2008a) demonstrated that following the comprehension of utterances that performed specific speech acts, participants were faster to respond to a target word that described the action conveyed by the speech act, relative to responding to the same target following a matched control sentence that did not involve the speech act. For example, following the utterance "*Don't forget to go to your dentist appointment today*" participants were quicker to respond to the word "*remind*" than they were when it followed the control sentence "*I'll bet you forgot to go to your dentist appointment today*". Holtgraves argues that this is because the first sentence activates the speech act of "*reminding*", while the second sentence does not. In a related paper, Holtgraves (2008b) demonstrated that the speech act verb itself also becomes encoded in a participant's memory for an utterance that performs the speech act. There is a long tradition of research within the area of conversation that suggests that speech act information plays a crucial role in how interlocutors understand each other's utterances (e.g., Clark, 1996). The question of whether such speech acts are recognised and mentally represented during rapid, incremental processing has received much less attention.

Many conditionals communicate speech acts as part of the situations they describe. Haigh et al. (2011) presented readers with conditionals embedded in vignettes and measured reading times using self-paced reading. Each conditional communicated a speech act (such as a promise, threat, or tip). For example, in one passage a car dealer said to a customer either "*if you buy the car, I'll give you 12 months free insurance*", or

“if you buy the car, make sure you negotiate with the insurance company for the best deal”. In the first case, the utterance corresponds to an implied promise, while in the second it corresponds to an implied tip. Haigh et al. found that subsequent anaphoric reference to an implied speech act resulted in a processing penalty if the anaphor that explicitly named the speech act mismatched the *implied* speech act. In other words, processing of subsequent anaphoric reference, such as, “*This was a useful promise...*” took longer following a conditional tip than following a conditional promise.

As the experiments reported by Holtgraves (2008a, 2008b) and by Haigh et al., involved the measurement of processing *downstream* of the utterance containing the speech act (in the case of Haigh et al.), or indirect measures of speech act activation (in the case of Holtgraves), it is possible that the effects reported do not reflect the activation of speech act information during the processing of the utterances containing the speech acts *themselves*. Indeed, in the case of the speech acts examined by Haigh et al., it may have been the case that they were activated only when *subsequent* integration of the anaphoric expression was required. So, the question as to whether speech acts are activated rapidly during online processing remains open. In the eye-tracking experiment below we focus on how knowledge about perceived speaker control impacts upon the online comprehension of conditional promises and tips.

### Experiment

In the experiment below we examine whether readers are sensitive to perceived speaker control during the processing of conditionals. If readers are sensitive to this information, then we expect to find disruption to eye-movements for conditionals that convey a

promise when the speaker does not have perceived control over the situation (relative to when the speaker does have perceived control). Furthermore, if this sensitivity occurs *rapidly*, then we expect to find effects emerging at the consequent region itself in measures of early language processing such as first-pass regressions out, and first-pass and regression path reading times (see below for definitions). For relatively long regions of text (as is the case with conditional consequents), first-pass regressions out and regression path times are the most appropriate measures of early processing since any regressions out of a region will, by definition, signal an end to normal reading patterns. Therefore, if sensitivity to perceived control has a rapid influence on comprehension, we would expect this to be reflected in increase first-pass regressions out and regression path times at the consequent region. However, if sensitivity occurs relatively late in processing, we would expect these effects to emerge in the critical region on total reading times only (as as this measures includes later processing), or on measures associated with processing the post-critical region. No disruption is expected for conditional tips as these do not require a speaker to have perceived control over the outcome event (Evans & Twyman-Musgrove, 1998).

### Method

#### *Participants*

Thirty-six native English speakers, with no language impairment, from the University of Kent participated in this study. Each was compensated £5 for their time.

#### *Design & Materials*



Experimental items consisted of conditional statements embedded in fictional vignettes. Prior context was manipulated so that the character uttering the conditional either had control or no control over the outcome of this statement. The conditional speech act itself was also manipulated to be either a promise or a tip by varying whether the speaker had perceived control over the outcome event (Evans & Twyman-Musgrove, 1998). This resulted in a fully-crossed 2 (Speaker Control) x 2 (Speech Act) repeated measures design comparing four conditions: (i) Control / Promise; (ii) Control / Tip; (iii) No control / Promise; and (iv) No control / Tip. Note that the conditional statement was lexically identical in conditions (i) and (iii) (promises) and conditions (ii) and (iv) (tips).

Thirty two experimental vignettes were constructed as in Table 1 below (see Appendix for full set of items). Each vignette was five sentences long. Sentence one introduced the protagonist (e.g., Alan). Sentence two provided further contextual information. Sentence three introduced a character who would later assert the conditional speech act. The character in this sentence was manipulated so that they either had perceived control or did not have perceived control over the outcome of the conditional speech act (e.g., a journal editor or junior colleague). Sentence four contained the conditional speech act, the consequence of which was manipulated to be either a promise (e.g. ‘...I will publish it in the next issue’) or a tip (e.g. ‘...it stands a good chance of being published’). Sentence five provided a neutral continuation for analysis of spillover effects.

One version of each item was assigned to one of four Latin-square presentation lists, with each list containing 32 experimental items, eight in each of the four conditions. These experimental items were interspersed randomly among 38 unrelated filler

vignettes, with each participant seeing a different random order. Nine participants were randomly assigned to read each list. Comprehension questions followed half of the experimental and filler trials. Participants did not receive feedback for their responses to these questions and all scored at or above 90% accuracy.

\*\*\*INSERT TABLE 1 HERE\*\*\*

### *Procedure*

Eye movements were recorded using an Eyelink 1000 eye-tracker in the Desktop Mount configuration. Viewing was binocular and recordings of gaze location and movement were sampled from the left eye at 1000 Hz. A chin and forehead rest was used to stabilise the participants' head position. Vignettes were presented in size 14 Arial font on a CRT monitor, 60 centimetres from the participants' eyes.

At the start of the experiment, the eye-tracker was calibrated and validated against nine fixation points to establish the correlation between x/y voltages and screen position. This procedure was repeated as necessary during the experiment. Participants were instructed to read at their normal rate for comprehension. Before each trial the screen was blank except for the presence of a gaze trigger, which was located at the top left of the screen - where the first character of the text would be displayed. Participants' accurate fixation on this gaze trigger automatically initiated the next trial presentation. After reading each sentence, participants clicked a button on the mouse that either led to the presentation of a comprehension question (after 50% of trials) or the next trial.

## Results

### *Methods of Analysis*

Each experimental item was divided into three regions for analysis, as shown in Table 1. The critical region was the consequent clause of the conditional statement. Note that this region was lexically *identical* in the two ‘promises’ conditions, and in the two ‘tips’ conditions. We also analysed a pre-critical region (the antecedent clause) and a post-critical region (sentence five), both of which were lexically identical across all four conditions.

An automatic procedure pooled fixations shorter than 80 msec. with adjacent fixations, excluded fixations that were shorter than 40 msec. if they were not within three characters of another fixation and truncated fixations longer than 1200 msec. Trials in which two or more adjacent regions had zero first-pass reading time were removed.

We analysed four processing measures. The first three provide information about early processing as a region of text is initially encountered and the final accounts for total processing. Table 2 displays mean values for each measure in each condition and region.

1. *First-pass reading time* is the sum of all the fixation durations from first entering the region until first exiting to the left or right.
2. *First-pass regressions out* is the percentage of trials in which regressive saccades were made from the current most rightward fixation into an earlier region. This measure indicates the degree to which left to right eye movements are disrupted while first reading a region of text.
3. *Regression path reading time* is the sum of all fixation durations from first entering a region until first exiting the region to the right (including all regressions). This is a measure of how long it takes a reader to *go past* a region of text after first entering it.

4. *Total reading time* is the sum of all fixation durations in a region.

\*\*\*INSERT TABLE 2 HERE\*\*\*

Analysis of effects in each region was performed using 2 x 2 (Speaker Control x Speech Act) repeated measures ANOVAs, with subjects ( $F_1$ ) and items ( $F_2$ ) as random factors.

#### *First-pass reading time*

No significant effects were found in the pre-critical region ( $F_s < 1$ ). However, in the critical region, the ANOVA revealed a main effect of speaker control ( $F_1(1, 35) = 10.01, p = .003, \eta_p^2 = .22; F_2(1, 31) = 7.57, p = .01, \eta_p^2 = .20$ ), with shorter first-pass reading times when the speaker had control than when the speaker did not have control. There was also a significant main effect of speech act ( $F_1(1, 35) = 24.91, p < .001, \eta_p^2 = .42; F_2(1, 31) = 4.35, p = .05, \eta_p^2 = .12$ ), with shorter first-pass reading times for promises than for tips. There was no interaction between these variables ( $F_s < 1$ ).

In the post-critical region, there was no longer a main effect of speaker control ( $F_1(1, 35) = 1.70, p = .20, \eta_p^2 = .05; F_2(1, 31) = 2.06, p = .16, \eta_p^2 = .06$ ), although there was a main effect of speech act ( $F_1(1, 35) = 12.69, p = .001, \eta_p^2 = .27; F_2(1, 31) = 17.83, p < .001, \eta_p^2 = .37$ ). As in the critical region, this region was read faster following a promise than following a tip. Speaker control and speech act did not interact in either the critical or post-critical regions (all  $F_s < 1$ ).

*First-pass regressions out*

Figure 1 illustrates how each condition affected the mean first-pass regressions out of each region during the pre-critical, critical and post-critical regions. No significant effects were found in the pre-critical region for speaker control ( $F_1(1, 35) = 2.03, p = .16, \eta_p^2 = .06$ ;  $F_2(1, 31) = 2.70, p = .11, \eta_p^2 = .08$ ), speech act (both  $F_s < 1$ ), nor for an interaction between these variables ( $F_1(1, 35) = 1.36, p = .25, \eta_p^2 = .04$ ;  $F_2(1, 31) = 1.49, p = .23, \eta_p^2 = .05$ ). The ANOVA in the critical region revealed main effects of speaker control ( $F_1(1, 35) = 6.52, p = .02, \eta_p^2 = .16$ ;  $F_2(1, 31) = 4.47, p = .04, \eta_p^2 = .13$ ) and speech act ( $F_1(1, 35) = 6.50, p = .02, \eta_p^2 = .16$ ;  $F_2(1, 31) = 9.84, p = .004, \eta_p^2 = .24$ ). Crucially, the ANOVA also revealed a significant interaction between these variables ( $F_1(1, 35) = 8.15, p = .007, \eta_p^2 = .19$ ;  $F_2(1, 31) = 5.77, p = .02, \eta_p^2 = .16$ ). Pairwise comparisons revealed that there was a higher incidence of first-pass regressions out of the critical region when it contained a promise and the speaker did not have control of the outcome compared to when the speaker had control of the outcome ( $t_1(35) = 3.39, p = .002$ ;  $t_2(31) = 2.57, p = .015$ ). However, when the speech act contained a tip, there was no significant difference between the two levels of speaker control ( $t_1(35) = 0.18, p = .86$ ;  $t_2(31) = 0.18, p = .86$ ).

The post-critical region revealed a main effect of speaker control ( $F_1(1, 35) = 6.99, p = .01, \eta_p^2 = .17$ ;  $F_2(1, 31) = 4.61, p = .04, \eta_p^2 = .13$ ), but no main effect of speech act ( $F_s < 1$ ). The interaction between these variables was once again significant (marginal by items) ( $F_1(1, 35) = 5.55, p = .02, \eta_p^2 = .14$ ;  $F_2(1, 31) = 3.46, p = .07, \eta_p^2 = .10$ ).

Pairwise comparisons revealed the same pattern of effects as in the critical region, with more first-pass regressions out when the speech act had described a promise and the speaker had no control over the outcome compared to when the speaker had control over

the outcome ( $t_1(35) = 3.59, p = .001; t_2(31) = 3.08, p = .004$ ). When the speech act had described a tip, there was no significant difference between speaker control conditions ( $t_1(35) = 0.62, p = .54; t_2(31) = 0.35, p = .73$ ).

\*\*\*INSERT FIGURE 1 HERE\*\*\*

### *Regression path reading time*

Figure 2 illustrates the mean regression path times for each condition in the pre-critical, critical and post-critical regions. No significant effects were found in the pre-critical region for speaker control ( $F_1(1, 35) = 2.27, p = .14, \eta_p^2 = .06; F_2(1, 31) = 3.06, p = .09, \eta_p^2 = .09$ ), Speech act ( $F_s < 1$ ) nor for an interaction between these variables ( $F_1 < 1; F_2(1, 31) = 1.12, p = .30, \eta_p^2 = .04$ ). In the critical region, a main effect of speaker control emerged ( $F_1(1, 35) = 14.15, p = .001, \eta_p^2 = .29; F_2(1, 31) = 12.43, p = .001, \eta_p^2 = .29$ ), but no main effect of speech act ( $F_s < 1$ ). Crucially, however, the interaction between speaker control and speech act was significant ( $F_1(1, 35) = 10.59, p = .003, \eta_p^2 = .23; F_2(1, 31) = 10.99, p = .002, \eta_p^2 = .26$ ). Pairwise comparisons revealed that regression path reading times were shorter for promises when the speaker had control of the outcome compared to when the speaker did not have control of the outcome ( $t_1(35) = 4.37, p < .001; t_2(31) = 3.81, p = .001$ ). However, for tips there was no difference between the levels of speaker control ( $t_1(35) = 0.57, p = .57; t_2(31) = 0.86, p = .39$ ).

Analyses in the post-critical region revealed main effects of both speaker control ( $F_1(1, 35) = 13.85, p = .001, \eta_p^2 = .28; F_2(1, 31) = 5.31, p = .03, \eta_p^2 = .15$ ) and speech act ( $F_1(1, 35) = 5.30, p = .03, \eta_p^2 = .13; F_2(1, 31) = 1.73, p = .05, \eta_p^2 = .05$ ). The interaction between these variables was also significant ( $F_1(1, 35) = 11.33, p = .002, \eta_p^2 = .25; F_2(1, 31) = 4.90, p = .03, \eta_p^2 = .14$ ), reflecting the same pattern of effects as found in the critical region. Regression path reading time for promises was shorter when the speaker had control of the outcome than when the speaker did not have control ( $t_1(35) = 4.30, p < .001; t_2(31) = 3.63, p = .001$ ). However, no difference emerged between the speaker control conditions for tips ( $t_1(35) = 0.44, p = .67; t_2(31) = 0.22, p = .83$ ).

\*\*\*INSERT FIGURE 2 HERE\*\*\*

### *Total Reading Time*

Figure 3 illustrates the mean total reading times for each condition in the pre-critical, and critical regions. In the pre-critical region, the ANOVA revealed significant main effects of speaker control ( $F_1(1, 35) = 7.32, p = .01, \eta_p^2 = .17; F_2(1, 31) = 4.75, p = .04, \eta_p^2 = .13$ ) and speech act ( $F_1(1, 35) = 5.57, p = .02, \eta_p^2 = .14; F_2(1, 31) = 5.21, p = .03, \eta_p^2 = .14$ ).

The interaction between these variables was significant by items and marginal by participants ( $F_1(1, 35) = 3.13, p = .09, \eta_p^2 = .08; F_2(1, 31) = 4.73, p = .04, \eta_p^2 = .13$ ).

Pairwise comparisons revealed that total reading times for promises were longer when the speaker did not have control of the outcome than when the speaker had control of the outcome ( $t_1(35) = 3.32, p = .002; t_2(31) = 2.94, p = .006$ ). However, for tips there was no

significant difference between the levels of speaker control ( $t_1(35) = 0.32, p = .75; t_2(31) = 0.45, p = .65$ ).

Results in the critical region also showed a main effect of speaker control ( $F_1(1, 35) = 28.57, p < .001, \eta_p^2 = .45; F_2(1, 31) = 19.28, p < .001, \eta_p^2 = .38$ ), and a main effect of speech act (significant by participants only) ( $F_1(1, 35) = 8.71, p = .006, \eta_p^2 = .20; F_2(1, 31) = 1.47, p = .24, \eta_p^2 = .05$ ). The interaction between these two variables was once again significant ( $F_1(1, 35) = 4.57, p = .04, \eta_p^2 = .12; F_2(1, 31) = 4.86, p = .035, \eta_p^2 = .14$ ), reflecting reduced total reading times for promises when the speaker had control of the outcome compared to when the speaker did not have control ( $t_1(35) = 5.03, p < .001; t_2(31) = 4.02, p < .001$ ). However, for tips there was no significant difference between the levels of speaker control ( $t_1(35) = 1.12, p = .27; t_2(31) = 1.29, p = .21$ ).

There were no significant main effects or interactions in the post-critical region ( $F_s < 1$ ).

\*\*\*INSERT FIGURE 3 HERE\*\*\*

### Discussion

We examined readers' sensitivity to whether a speaker who uttered a conditional statement had perceived control over the consequent event. Specifically, we were interested in whether processing a conditional promise would result in disruption to eye-movements when the speaker asserted control of the consequent event in situations where they did not have perceived control. We found clear evidence of this being the case; for conditional promises readers were rapidly sensitive to the degree of perceived control the



speaker had over the consequent event. This manifested itself in a number of eye-movement measures including, crucially, first-pass regressions out and regression path analyses. Both of these measures index early processing. Across all our eye-movement measures we found consistent evidence of an asymmetrical interaction effect. Out of our four conditions, the condition that repeatedly drove this interaction via disruption to processing was that in which the speaker of a conditional asserted control over an outcome event (i.e., the speaker uttered a promise) in situations where they did not possess such control. Readers were rapidly sensitive to this incongruency. In contrast, conditional tips (i.e., where the speaker did not assert control over the outcome event) were processed equivalently easily, regardless of whether the speaker did or did not have control over the outcome.

As interpretation of the asymmetrical interaction is critical in our claim that readers are rapidly sensitive to perceived control (and thus represent conditional speech acts during incremental processing), it is important to note that this interaction allows us to rule out any influence due to lexical differences between our materials. Specifically, in our critical region we compared conditional promises in the context of the speaker possessing control over the outcome event to the *same* conditional promises in contexts lacking this control. This was also the case for comparisons involving conditional tips. We can thus be confident that the differences we report between conditional promises (under the two levels of control) and the lack of differences between conditional tips (again, under the two levels of control) unambiguously reflect readers' sensitivity to perceived speaker control.

In addition to the interaction effect in the critical region, we also found evidence of effects emerging in the post-critical region. For the first-pass regressions out and regression path measures, these were of a similar type to the interaction found in the critical region and likely reflects sustained disruption to processing following conditional promises in the absence of speaker control. We also found evidence in first-pass reading times to the critical and post-critical regions of a main effect related to speech act (with greater reading times following conditional tips). For the critical region, simple lexical differences are likely to be behind this effect. However, the post-critical region was lexically identical across conditions; therefore this effect cannot be explained by lexical differences. The effect here *may* indicate a processing difference between promises and tips; however, we suspect that the most likely interpretation of this difference is in terms of spill-over effects related to the processing of the preceding (critical) region of text. Importantly, given our experimental design it is the interaction between our two factors (rather than any main effects) that is of central importance and this cannot be explained by lexical differences. The consistent nature of this interaction strongly supports the view that perceived speaker control has a rapid influence upon the processing of conditional speech acts

Speaker control

-Rousseau and

Ketelaar (2004, 2006) whether the speaker has control over an outcome event plays an early role in determining whether a speech act is likely to be an a promise or a tip.

Additionally, Evans and Twyman-Musgrove (1998) showed that in a conditional reasoning task the *perception* of control is important as it impacts upon the extent to

which people draw logical inferences from conditional promises (see also Ohm & Thompson, 2004, for further evidence in support of the importance of the perception of control). These slightly differing views *vis-a-vis* control can be reconciled by assuming that for a conditional to be unambiguously interpreted as a promise by a recipient, the speaker does not just need to *have* control over the outcome event, but also needs to have *perceived* control. This may arise through explicit assertion (e.g., through the use of the pronoun, *I*, as was the case with the vast majority of our materials) or be implicit in nature (e.g., involving a highly stereotyped context).

The interaction that we consistently found indicates that conditional promises result in processing disruption when speaker control is known to be absent, and that conditional tips are always relatively easy to comprehend. One possible reason for this asymmetry relates to the view that promises are pragmatically stronger than tips (Evans, 2005). It may follow then that for promises there is a higher burden of proof on behalf of the recipient in terms of ensuring speaker control is present, which then licenses the ability of a speaker to utter a conditional promise. For tips, this pragmatic burden would be lower with the result being that conditional tips are processed more straightforwardly (and with less reference to prior context) than conditional promises. This would account for the pattern of data we report.

In addition to the importance perceived speaker control in conditional speech acts, other research has also highlighted an influence of the credibility of the speaker (Verbrugge, Dieussaert, Schaeken, & Van Belle, 2004) and the possible emotional consequences that follow from different conditional inducements (Beller, Bender, & Kuhnmünch, 2005). Furthermore, Beller et al. discuss a level of analysis associated with

inducements that highlights the motivational nature underlying this type of speech act. Specifically, promises follow from a speaker wanting a hearer to engage in behaviour that results in a particular outcome, and also from the hearer being motivated to achieve that particular outcome.

In addition to factors associated with speaker control having a rapid impact upon the processing of conditionals, there is emerging evidence of other information exerting an early influence on processing. For example, Haigh et al. (under review) demonstrate that conditionals uttered by (e.g.) a journal editor to an author such as *if you submit your paper to the Journal of Physics, then I will accept it outright* result in a processing penalty when presented in contexts in which the reader expects the editor to have a *positive* view of the author's paper. In an eye-movement study, Haigh et al. report that this sensitivity to expectation emerged on a wide range of measures including those associated with early stages of processing (e.g. first-pass regression out and regression path reading times). In terms of our examination of speaker control, the data we report above also indicates disruption to early stages of processing. It is important in the development of processing-oriented accounts of conditionals that the early influences on processing of utility and speaker control information are recognised.

Together with the eye-tracking data we report above, there is strong evidence that many different sources of information have the potential to impact upon the comprehension of conditional speech acts. Furthermore, it appears that a number of sources also have the potential to impact upon comprehension *rapidly*. One particular challenge for researchers in the area of conditionals, therefore, is to better understand the temporal dynamics of the influences of these factors upon online processing.

### Acknowledgements

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Table 1: Example item showing regions of analysis.*Control / Promise*

Alan had just presented his research paper to a meeting of leading physicists. During the coffee break he was called over by the Editor of the internationally renowned Journal of Physics. The Editor was very impressed by Alan’s findings and said that they should be widely publicised. As they parted, the Editor told Alan |“if you submit your paper to the Journal of Physics, PRE-CRITICAL|then I will publish it in the next issue”. CRITICAL|This comment made Alan consider his options carefully. POST-CRITICAL|

*Control / Tip*

Alan had just presented his research paper to a meeting of leading physicists. During the coffee break he was called over by the Editor of the internationally renowned Journal of Physics. The Editor was very impressed by Alan’s findings and said that they should be widely publicised. As they parted, the Editor told Alan |“if you submit your paper to the Journal of Physics, PRE-CRITICAL|then it stands a good chance of being published”. CRITICAL|This comment made Alan consider his options carefully. POST-CRITICAL|

*No Control / Promise*

Alan had just presented his research paper to a meeting of leading physicists. During the coffee break he was called over by a junior colleague. The colleague was very impressed by Alan’s findings and said that they should be widely publicised. As they parted, the colleague told Alan |“if you submit your paper to the Journal of Physics, PRE-CRITICAL|then I will publish it in the next issue”. CRITICAL|This comment made Alan consider his options carefully. POST-CRITICAL|

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Comprehension question: Did Alan meet the Editor during the lunch break?

Table 2: Mean reading times and regressions out for each region (standard errors in parenthesis).

Speaker Control /Speech Act	First-pass (msec.)	First-pass Regressions Out %	Regression Path (msec.)	Total Time (msec.)
<i>Pre-Critical Region</i>				
Control / Promise	633 (45)	5.7 (1.6)	703 (43)	785 (49)
Control / Tip	616 (40)	8.9 (1.9)	734 (63)	772 (48)
No control / Promise	622 (41)	10.1 (1.8)	790 (60)	898 (54)
No control / Tip	621 (33)	9.1 (2.1)	765 (57)	784 (38)
<i>Critical Region</i>				
Control / Promise	745 (39)	16.5 (2.7)	930 (51)	934 (59)
Control / Tip	897 (49)	16.2 (2.3)	1,134 (58)	1,107 (64)
No control / Promise	852 (49)	28.6 (3.3)	1,288 (91)	1,164 (64)
No control / Tip	957 (60)	15.7 (2.4)	1,169 (65)	1,164 (64)
<i>Post-Critical Region</i>				
Control / Promise	1,793 (95)	59.0 (4.5)	2,946 (213)	2,103 (144)
Control / Tip	1,947 (104)	62.3 (4.4)	3,146 (219)	2,208 (116)
No control / Promise	1,668 (107)	71.0 (3.9)	3,651 (256)	2,189 (125)
No control / Tip	1,914 (129)	64.4 (4.0)	3,095(212)	2,150 (142)

Figure 1: Mean first-pass regressions out from the pre-critical, critical and post-critical regions. Error bars show standard errors.

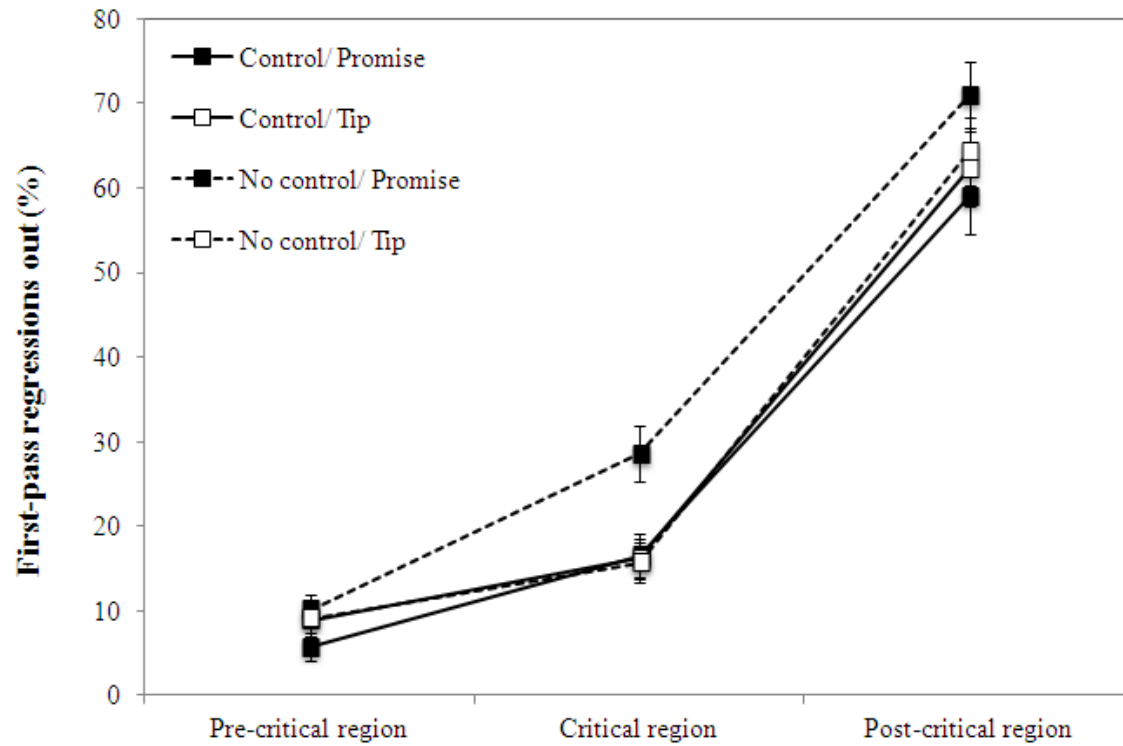


Figure 2: Mean regression path reading times for the pre-critical, critical and post-critical regions. Error bars show standard errors.

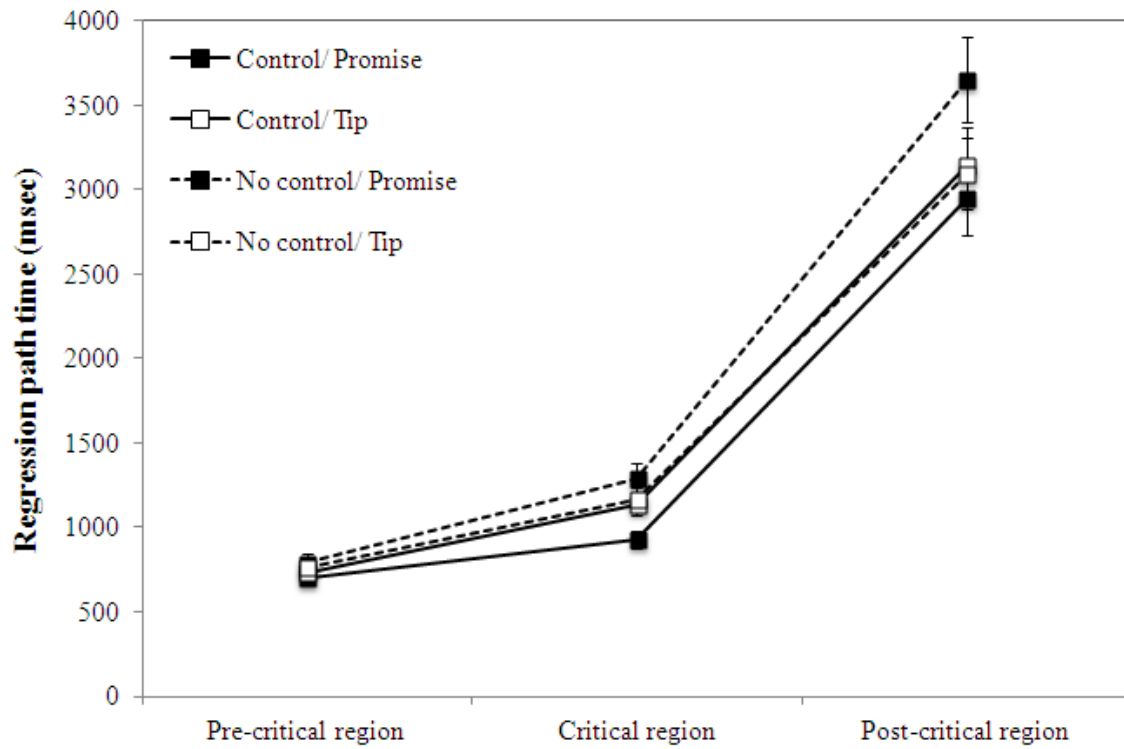
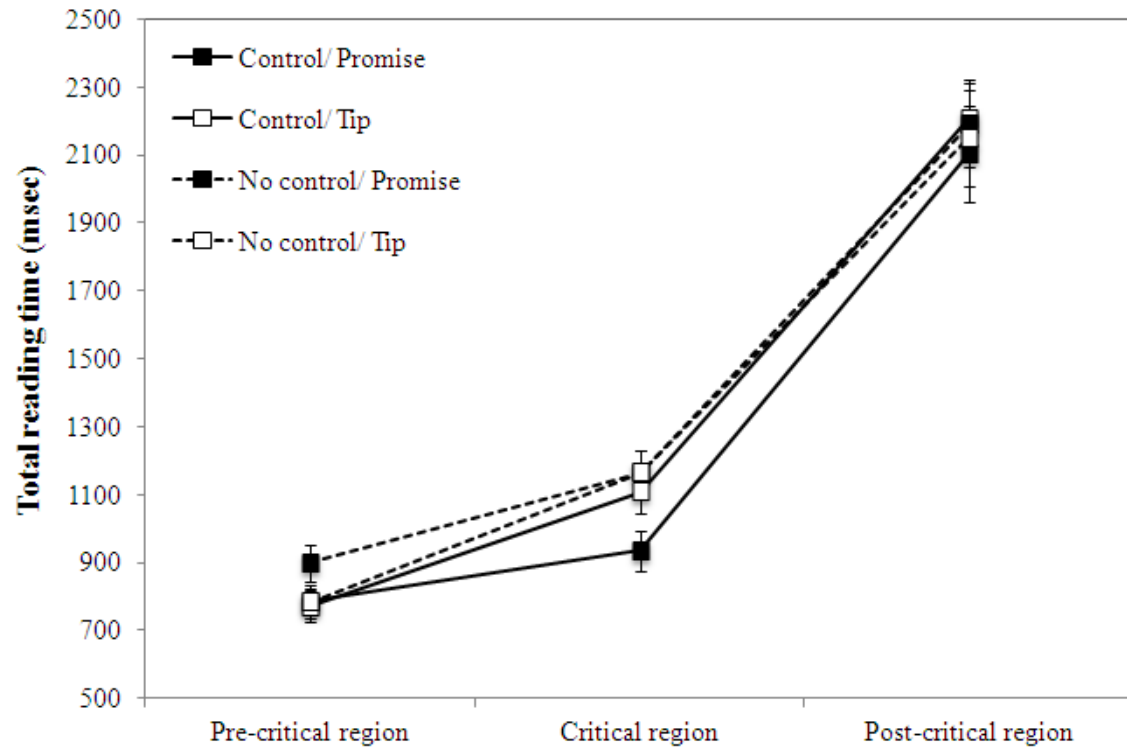


Figure 3: Mean total reading times on the pre-critical and critical regions. Error bars show standard errors.



Appendix

*Experimental items. Note that for each of the items below, conditions are listed in the order: Control/ promise, Control/ tip, No control/ promise, and No control/ tip.*

1.

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2.

Scott loved dance music and was desperate to go to the opening night of an exclusive new club in town. He had recently chatted to the owner of the club at a networking event organised through work. The owner seemed to really like Scott and admired his passion for dance music. As they parted, the owner told Scott "If you go to the opening night, I'll put you on the guest list". With this in mind Scott began to think about what he might wear.

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Scott loved dance music and was desperate to go to the opening night of an exclusive new club in town. He had recently chatted about the club with his fourteen year old sister. She had passion for dance music but was far too young to attend a club herself. As they parted, she told Scott “If you go to the opening night, I’ll put you on the guest list”. With this in mind Scott began to think about what he might wear.

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3.

Sarah was at work in her local branch of McDonald’s. She was hoping to leave her shift early to make it to the cinema in time to meet her friends. She discussed this possibility with her manager. He said to her “if you leave early, I’ll allow it”. The film was due to start 10 minutes before her shift officially ended.

Sarah was at work in her local branch of McDonald’s. She was hoping to leave her shift early to make it to the cinema in time to meet her friends. She discussed this possibility with her manager. He said to her “if you leave early, nobody will notice”. The film was due to start 10 minutes before her shift officially ended.

Sarah was at work in her local branch of McDonald’s. She was hoping to leave her shift early to make it to the cinema in time to meet her friends. She discussed this possibility with a junior colleague. He said to her “if you leave early, I’ll allow it”. The film was due to start 10 minutes before her shift officially ended.

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4.

Oliver was a lecturer at a respected university. After two unsuccessful attempts he was thinking about applying for promotion for the third time that year. Before putting in his application he decided to discuss the matter with the Head of the promotions committee. The Head of the committee said to Oliver “if you apply for promotion again, I will accept your application”. With this in mind Oliver considered his options.

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application he decided to discuss the matter with the Head of the promotions committee. The Head of the committee said to Oliver “if you apply for promotion again, there is a good chance of success”. With this in mind Oliver considered his options.

Oliver was a lecturer at a respected university. After two unsuccessful attempts he was thinking about applying for promotion for the third time that year. Before putting in his application he decided to discuss the matter with one of his undergraduate students. The student said to Oliver “if you apply for promotion again, I will accept your application”. With this in mind Oliver considered his options.

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5.

Julio was a top Premier League footballer. He had just been invited to an exclusive charity ball that would guarantee a lot of publicity for his club. He told his manager that he was thinking about going to the event. His manager told him “if you go to the charity ball, you’ll be picked for the game on Saturday”. With this in mind Julio made his decision.

Julio was a top Premier League footballer. He had just been invited to an exclusive charity ball that would guarantee a lot of publicity for his club. He told his manager that he was thinking about going to the event. His manager told him “if you go to the charity ball, it will look good for the club”. With this in mind Julio made his decision.

Julio was a top Premier League footballer. He had just been invited to an exclusive charity ball that would guarantee a lot of publicity for his club. He told his team mate that he was thinking about going to the event. His team mate told him “if you go to the charity ball, you’ll be picked for the game on Saturday”. With this in mind Julio made his decision.

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6.

Leanne was struggling to finish her essay before the deadline. It was Wednesday morning and the essay was due to be handed in on Friday afternoon. She phoned her lecturer and said she was thinking about handing it in the following Monday. Her lecturer said “if you hand your essay in late, I won’t penalise you”. Leanne felt that having the weekend to work on it would make all the difference.



Leanne was struggling to finish her essay before the deadline. It was Wednesday morning and the essay was due to be handed in on Friday afternoon. She phoned her lecturer and said she was thinking about handing it in the following Monday. Her lecturer said “if you hand your essay in late, fill out a mitigating circumstances form”. Leanne felt that having the weekend to work on it would make all the difference.

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7.

Dave was planning to build a kitchen extension on the side of his house. He had already begun to dig the foundations. Before going any further he decided to phone the building inspector at the council to see whether his proposed extension would be allowed. The inspector told him “if you build the extension, I will officially approve it”. Winter was approaching and Dave was keen to build the extension before the weather turned.

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8.

Laura was on her way home from work and intended to pick up her dry cleaning on the way. Unfortunately, the only place to park was a loading bay outside the dry cleaners. She pulled into the space and called over a passing parking warden to ask about the parking restrictions. The warden told her “if you park here, I won’t give you a ticket”. She was only planning to stay there for five minutes at most.

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9.

Anna was a teacher at a local school. After only a year in the job she was considering asking for six months leave to go travelling. Before putting in her application she decided to discuss the matter with her head teacher. He said to Anna “if you go travelling, I’ll keep your job open for you”. With this in mind Anna made her decision.

Anna was a teacher at a local school. After only a year in the job she was considering asking for six months leave to go travelling. Before putting in her application she decided to discuss the matter with her head teacher. He said to Anna “if you go travelling, consider the impact on your career”. With this in mind Anna made her decision.

Anna was a teacher at a local school. After only a year in the job she was considering asking for six months leave to go travelling. Before putting in her application she decided to discuss the matter with her father. He said to Anna “if you go travelling, I’ll keep your job open for you”. With this in mind Anna made her decision.

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10.

Wayne was a top Premier League footballer. After a wild night out to celebrate his birthday he didn't feel up to a long training session. He phoned his manager and told him that he was thinking about missing training. His manager told him "if you miss training, I'll excuse you this time". Wayne knew he shouldn't have stayed out late and was beginning to regret his actions.

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11.

Adam was a 17 year old who had just passed his driving test. He was hoping to borrow his dad's car to drive to football practice. That morning he asked his dad over breakfast if he could take the car. His dad told him "if you want the car, I'll let you keep it over the weekend." It had only been a week since Adam passed and he wanted to drive as much as possible.

Adam was a 17 year old who had just passed his driving test. He was hoping to borrow his dad's car to drive to football practice. That morning he asked his dad over breakfast if he could take the car. His dad told him "if you want the car, make sure there's enough petrol in it." It had only been a week since Adam passed and he wanted to drive as much as possible.

Adam was a 17 year old who had just passed his driving test. He was hoping to borrow his dad's car to drive to football practice. He mentioned to his younger brother that he was planning to take the car. His brother told him "if you want the car, I'll let you keep it over the weekend." It had only been a week since Adam passed and he wanted to drive as much as possible.

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12.

Richard had just started work at a call centre on the outskirts of town. After a few hours in his new job he received a text message from his girlfriend asking him to call her as soon as possible. He consulted his boss about whether he could make a personal phone call during work hours. He was told “if you make a personal phone call at work, I won’t punish you”. Richard hoped he didn’t come across as cheeky by asking such questions on his first day.

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Pamela was unhappy in her job and was considering a change. She had already signed up to a recruitment agency and was hoping to get some interviews lined up. She consulted her manager to discuss her options. Her manager told her “if you leave the company, I’ll give you a good reference”. Pamela had already decided that she wanted to leave as soon as possible.

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14.

Oleg was a Russian millionaire who wanted build a new shopping centre on the outskirts of Moscow. However, the head planning official had rejected his application outright. He decided to phone the head planning official directly to offer him a bribe. Oleg was told “if you offer a bribe, I’ll give you permission to build”. Bribery was often the most efficient way to get anything done in this part of the world.

Oleg was a Russian millionaire who wanted build a new shopping centre on the outskirts of Moscow. However, the head planning official had rejected his application outright. He decided to phone the head planning official directly to offer him a bribe. Oleg was told “if you offer a bribe, you may be arrested”. Bribery was often the most efficient way to get anything done in this part of the world.

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Harold was a researcher at a large university. After failing to get any research funding from the government research council he decided to apply for money from his department. Before submitting his application he decided to discuss the matter with his head of department. The head of department told Harold “if you apply for funding, I’ll approve your application”. With this in mind Harold weighed up his options.

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16.

Poppy was busy looking for jobs. She had recently seen a secretarial position advertised at a local double glazing company. She decided to phone the manager of the company and tell him about herself. After a long conversation, the manager said to her “if you apply for the job, I’ll offer you it straight away”. Jobs were often hard to come by where Poppy lived.

Poppy was busy looking for jobs. She had recently seen a secretarial position advertised at a local double glazing company. She decided to phone the manager of the company and tell him about herself. After a long conversation, the manager said to her “if you apply for the job, you should include a professional looking CV”. Jobs were often hard to come by where Poppy lived.

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17.

Carl had been in prison for just over a year. He had another two years to serve and was thinking about applying for early release. He decided to discuss this possibility with the prison governor. The governor told him “if you want early release, I will grant it”. Carl was keen to finish his sentence as soon as possible and get back to his family.

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Claudia was studying for a PhD in Chemistry. However, she was sure that it would take longer than the allotted three years. She decided to discuss this with her head of department. He said “if you take more than three years, I’ll give you extra funding”. Government cuts had made funding very difficult to come by.

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Kelly was auditioning for a high profile televised singing contest. She had two chances to sing to the judges. After her first song she received some comments from the head judge. She was told “if you perform like that again, I’ll put into the next round”. Kelly knew that her second song was the final chance to impress.

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Roy was the manager of a top football team. Recently results had been poor and some fans had begun to demand a change of manager. Roy discussed this with the owner of the club. He was told “if you lose the next game, I won’t fire you”. Roy knew he needed to win the next game to get the fans back on his side.

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Brian lived in a leafy suburb of Manchester and loved spending time out in the garden. However, there was an enormous tree overlooking his house that blocked out most of the sunlight. Brian wanted to cut the tree down and discussed this possibility with a council environment officer. He was told “if you apply to cut down the tree, I will personally approve it”. The summer was approaching and Brian was keen to get this problem sorted out before then.

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Peter was a very popular but occasionally naughty high school student in his final year. The selection of prefects was coming up and he was unsure whether or not to put himself forward for it. He decided to discuss this with his head teacher. The head teacher said “if you apply to be a prefect, I will elect you”. This comment helped Peter to make up his mind.

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Mary had just moved into a new flat that she was renting from a private landlord. She was keen to have a house warming party but was unsure if that would be allowed. She decided to phone her landlord to ask for advice. Her landlord said “if you want a party, I’ll allow it”. This comment helped Mary to make up her mind.

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Brad was the singer in a local heavy metal band. He was desperate for a recording contract so that his band could become professional. Luckily his uncle was a producer for an international record label. His uncle told him “if you want a recording contract, I’ll give you one”. This gave Brad the motivation to practice harder than ever.

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John was thinking about taking a year off work to go travelling. He already had a good job and was unsure of whether his job would be kept open for him on his return. He decided to discuss the matter with his boss. His boss said to him “if you go travelling, I’ll ensure your job is kept open for you”. John felt that this might be his only chance to go travelling.

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Kevin was going away on an all expenses paid business trip to New York and needed to book a hotel for his stay. He was thinking about booking a swanky five star hotel that charged over £300 per night. Before he booked, he consulted his boss about whether this would be acceptable. He was told “if you book a five star hotel, I’ll cover the full cost”. Kevin often had to travel the world on business trips like this.

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Peter had recently damaged his knee playing football. He needed to drive to an important meeting but his knee was too weak to drive. He discussed this predicament with his father. His father told him “if you can’t drive, then I will drive”. Peter wished he could call off the meeting, but it was far too important.

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Dave and Richard were students who decided to go on a night out dressed as Batman and Robin. However, as they stood in a long queue for the nightclub Dave worried that they might not be let in. Dave decided to walk to the front of the queue to ask the doorman if they’d be allowed in. He was told “if you keep that costume on, I’ll let you in”. Fancy dress nights always guaranteed them a lot of attention.

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Brian worked as salesperson in a busy office. He had been unsettled in his job and was thinking about leaving the company. He decided to discuss this predicament with his manager. The boss told him “if you decide to leave, I’ll accept your resignation”. Jobs were hard to come by but Brian was willing to take his chances in the job market.

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Laura was thinking of applying for a secretarial job at a high profile law firm. To give herself the best chance she knew she needed a good reference. Before applying she decided to discuss this with her current manager. She was told “if you apply for the job, I’ll give you a glowing reference”. The deadline for applications was approaching soon and Laura needed just one more reference.

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Laura was desperate to go on a gap year after university. However she had no job and no cash. She discussed this issue with her father, who had recently had a big win on the National Lottery. He told her “if you want to do it, I’ll pay for you”. She had dreamt of travelling ever since she was a child.

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