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Factors Influencing Audience Design During Interpersonal Communication

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The second chapter of this thesis constitutes a published version of the first study of the PhD undertaken by Shane Rogers. Shane conceptualized the study in collaboration with supervisors, carried out the experiments and analysed data largely independently, and the paper was written with feedback and guidance from supervisors.

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Abstract

This thesis investigates factors influencing audience design – the communicative act of designing one’s message by considering the perspective of one’s audience. A series of studies were carried out to investigate a number of factors that influence how people design their communication using a referential communication task paradigm. These factors included the degree of interaction with the audience (Chapter 2), group size (Chapters 2 & 3), majority influence (Chapter 3), estimates of communicative effectiveness (Chapter 4), and age (Chapter 4). This thesis provides evidence to suggest that: In an interactive context people are less likely to design their initial message compared with a non-interactive context; increasing audience size does not influence audience design; the presence of a majority perspective within a group audience will increase a person’s tendency to engage in audience design; estimates of communicative effectiveness influence audience design by making people less likely to design due to commonly appraising their own perspective to be superior to the perspective of the audience; older adults are less inclined to engage in audience design compared to younger adults. This thesis adds to the audience design literature by illustrating how a number of different factors can act to increase or decrease audience design behaviour.
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1. General introduction

_Audience design_ is a term used to describe human communication that has been produced with the perspective of the audience in mind (Bell, 1984; H. H. Clark & Murphy, 1982; Fussell & Krauss, 1991). In contrast to this type of allocentric communication, egocentric communication occurs without any consideration of the audience. As an example consider faux pas, an act of communication produced without consideration of the audience’s perspective, possibly resulting in negative consequences that the speaker never intended (Baron-Cohen, O’Riordan, Stone, Jones, & Plaisted, 1999). Provided below is a specific example of a faux pas:

| Raoul: Hey you wrote the script for that play shown in the Dolphin Theatre on the weekend didn’t you? |
| Brad: (smiling) yes that’s right |
| Raoul: I saw in the University newspaper that it got a poor review |
| Brad: (no longer smiling) yes, that’s right |

Baron-Cohen et al., (1999) describe how it is the “uh-oh!” emotion most people would feel if they were in the shoes of Raoul in the provided example that really characterizes faux pas. Another way to define a faux pas could be to describe it as a failure of audience design that results in an unintended insult. Consideration of the audience perspective is required for a range of other specific communicative acts such as sarcasm, irony, and bluffing (Baron-Cohen et al., 1999). Developmental psychologists assess children’s ability to detect and understand such communicative acts as an indication of their perspective taking ability or _theory of mind_ (Baron-Cohen et al., 1999; Kaland, Callesen, Moller-Nielsen, Mortensen, & Smith, 2008).

Communication can be designed for the audience to achieve various objectives, such as deception (H. H. Clark & Schaefer, 1987), maintaining a particular identity (Fleming, Darley, Hilton, & Kojetin, 1990), persuasion (Bartsch & London, 2000), fostering a sense of closeness with others (A. E. Clark & Kashima, 2007), and being informative (Wittwer, Nuckles, Landmann, & Renkl, 2010). This thesis investigates different factors that influence audience design when the primary communication goal is to be _informative_. There are many situational and dispositional factors identified in the research literature that influence audience design (Krauss & Fussell, 1996; Schober, 1998; Schober & Brennan, 2003). This thesis aims to contribute to the literature by selectively
focusing on a few of these factors: group size and level of interaction (Chapter 2), knowledge of the audience perspective and majority influence (Chapter 3), estimates of communicative effectiveness and age (Chapter 4). The introduction first reviews the literature regarding the changing role of perspective taking in communication theory over the past few decades to provide a context for the current investigation. This is followed by a rationale justifying the examination of the specific factors investigated in this thesis.

1.1. Audience design and theories of communication

As experimental evidence has accumulated, different communication models have been proposed, such as the mathematical theory of communication (Shannon & Weaver, 1949), the collaborative model of communication (H. H. Clark, 1996; H. H. Clark & Bangerter, 2004; H. H. Clark & Wilkes-Gibbs, 1986), the monitoring and adjustment model (Horton & Keysar, 1996; Keysar, 2007), the interactive alignment model (Pickering & Garrod, 2004, 2013), and the memory resonance model (Horton & Gerrig, 2005a, 2005b; Horton & Slaten, 2012). In the sections to follow, it will be described how the importance placed upon perspective taking (with associated audience design) has changed in the research literature over time.

1.1.1. Encoder/Decoder model

Early communication theory did not include any conceptualisation of audience design. An example is the mathematical theory of communication (Shannon & Weaver, 1949). This theory was consistent with the prevailing philosophy of the time that communication was an autonomous process (For a review see: Krauss & Fussell, 1996). That is, the message producer (encoder) and receiver (decoder) act independently of one another. The message producer formulates their message based on what is most salient to them, and then encodes their message into a transmittable code such as speech, gesture or writing. The message is then decoded by the receiver to determine the encoder’s meaning.

However, this theory fell out of favour as it did not adequately take into account that the same message can mean different things to different people (Krauss, 1987). For example, studies have demonstrated that highly anxious individuals are biased to perceive more threat in ambiguous messages compared with less anxious individuals (MacLeod & Mathews, 2012). Additionally, the same
message may mean different things at different times for the same individual based on variations in mood or expectations (Gotlib & Joormann, 2010; Jussim, 1986; MacLeod & Mathews, 2012). To help minimise the ambiguity of language, Piaget (1926) theorized that as children mature and develop their perspective taking ability they produce *socialized speech* that takes into account the perspective of their audience. This contrasts with early *egocentric speech* that does not consider the audience. These ideas were similar to another famous developmental psychologist (Vygotsky) who theorized about *internal egocentric* communication for one self and *external allocentric* communication for others (Wertsch & Tulviste, 1992). A problem with early communication theory was that it only described *egocentric speech*. However Piaget and Vygotsky’s ideas about socialized speech became prominent in communication research with the advent of pioneering *referential communication task* studies by Krauss and Weinheimer (1964, 1966), culminating in the proposal of the term audience design to describe communication produced via perspective taking (Bell, 1984; H. H. Clark & Murphy, 1982).

1.1.2. Genesis of the term ‘audience design’

In the initial referential communication experiment conducted by Krauss and Weinheimer (1964) participants described abstract shapes one at a time for a co-present partner, see Figure 1.1. The partner tried to pick the described shape from a jumbled array of shapes. Therefore, participants needed to produce descriptions that could successfully distinguish each shape from all other shapes. For example, a description produced by a participant for the bottom right shape in Figure 1.1 was “a spider on a dime”. In this experiment it was found that as participants re-referred to the same shapes over successive trials the number of words used to describe the shapes rapidly decreased as participants collaboratively developed shortened labels for the stimuli. For example, shortening the phrase “a boomerang with a notch in the blade” to a simple label “boomerang” by the fourth repetition (Krauss & Weinheimer, 1964).
Krauss and Weinheimer proposed that the reduction in words occurred as the speaker adapted to the perspective of their listener as they received confirmation of understanding. This assumption was tested in a follow up experiment manipulating the amount of feedback that the participants received (Krauss & Weinheimer, 1966). In the concurrent feedback (CF) condition the participant freely interacted with their partner (via an intercom), and in the no concurrent feedback condition (NCF) there was no interaction between speaker and listener. In the NCF condition the partner introduced to participants was a confederate of the experimenter. Additionally, the experimenter controlled accuracy feedback provided throughout the task by a light appearing that informed participants that the shape the listener chose was correct on either 50% or 100% of trials. The results of this study are presented in Figure 1.2. Being able to freely interact accelerated the rate of decline in words across repetitions compared to when interaction was not allowed. Furthermore, the level of accuracy portrayed to participants also accelerated the rate of decline – faster decline when the speaker was led to believe they were communicating effectively (effective on 100% of trials) compared to when led to believe communication was not so effective (effective on only 50% of trials). When the speaker could not interact with their partner, and were informed they were only 50% effective, this instead resulted in an increase in words across trials, see Figure 1.2. Taken together, results were argued to show that speakers were sensitive to and adapted their communication based on the amount of feedback available, and the level of understanding displayed by their partner.
A follow up study by Krauss, Vivekananthan, and Weinheimer (1968) compared comprehension accuracy and lexical characteristics of descriptions produced for self, versus descriptions produced for others. Participants were most accurate with descriptions they produced for themselves. They were less accurate at comprehending descriptions of other participants whom had produced descriptions intended to be understood by others. They were least accurate with descriptions produced by other participants for their own personal use.

Furthermore it was found that descriptions produced for oneself were typically more idiosyncratic compared to descriptions intended to be understandable to others. These findings provided evidence consistent with the underlying assumption that in the referential communication task paradigm participants adapt their communication for an audience. Or in other words, when adult participants produce descriptions intended for other people to understand, they engage in socialised communication instead of egocentric communication.

Around the same time, Glucksberg, Krauss, and Weisberg (1966) examined the referential communication task performance of children. The task was modified to be appropriate for use with children, placing the stimuli images used by Krauss and Weinheimer (1964) on toy blocks. If perspective taking was required to perform the task effectively, it was hypothesized that children would perform poorly due to an under-developed perspective taking ability. By employing a number of variants of the task it was found that: Children aged 3-4 years could not perform the task adequately enough for testing purposes with the novel shapes as stimuli; however these young children could perform the task when referring about familiar animals. Children 4-5 years could perform the task, however produced short idiosyncratic references (e.g., “mommy’s hat”) from the
beginning that caused performance (partner accuracy) on the task to be low. When the child was provided their own idiosyncratic references by the experimenter to identify the shapes, they performed very well. When an experimenter played the role of speaker the children were able to follow along quite well even as the reference phrases were shortened across trials. The authors concluded that children had difficulty describing the stimuli for others to understand, due to egocentric communication. Krauss and Glucksberg (1969) extended the 1966 experiment by examining a larger age range of children: 5-10 year olds. They found that the ability to become more efficient with the use of words across repetitions improved with age (kindergarten vs. 1st vs. 3rd vs. 5th graders). By providing the descriptions produced by the children to adults to decipher it was also found that the ability to produce understandable descriptions improved with age. This research was argued to support the notion that children’s developing perspective taking ability goes hand in hand with their developing ability for effective referential communication.

During the 70s and 80s the pioneering studies of Krauss and colleagues inspired further research on children’s communication using referential communication tasks in conjunction with other measures. Some studies replicated original findings of Krauss and colleagues using different to-be-communicated stimuli (Karabenick & Miller, 1977; Maratsos, 1973). Other studies explored the relationship between general perspective-taking ability and/or popularity with peers with referential communication task ability (R. A. Clark & Delia, 1977; Goldman, Corsini, & DeUristoe, 1980; Gottman, Gonso, & Rasmussen, 1975; Krantz, 1982; Roberts & Patterson, 1983; K. H. Rubin, 1972). Related to this research others further explored specific reasons for children’s referential communication difficulties associated with perspective-taking such as engaging in comparison activity or evaluating the quality of messages (Asher, 1976; Asher & Oden, 1976; Asher & Parke, 1975; Beal & Flavell, 1983; Deutsch & Pechmann, 1982; E. Robinson, Goelman, & Olson, 1983). Other research focused on improving referential communication performance by modelling adults, or providing children with specific instructions regarding how to design messages or ask questions (Asher & Wigfield, 1981; Dickson & Patterson, 1981; Ironsmith & Whitehurst, 1978; Patterson, Massad, & Cosgrove, 1978; Sonnenschein, 1984; Sonnenschein & Whitehurst, 1983, 1984a, 1984b).

As research investigating perspective taking in children’s communication was flourishing, other researchers began to formalise the importance of
perspective taking into communication theories. The specific term *audience design* was introduced to describe communication that was produced via consideration of the audience perspective (Bell, 1984; H. H. Clark & Murphy, 1982). In sociolinguistics *communication accommodation theory* (CAT) became popular as a foundational theory describing how stylistic variation of communication, across all levels of discourse from pronunciation to topic selection, is influenced by the intended audience (Giles, Coupland, & Coupland, 1991; Giles & Gasiorek, 2012). In the field of social psychology, Clark and colleagues began explaining the underlying social cognitive determinants of audience design – *The collaborative model of communication* (H. H. Clark, 1996; H. H. Clark & Bangerter, 2004; H. H. Clark & Wilkes-Gibbs, 1986).

### 1.1.3. The collaborative model of communication

Rather than simply describing instances where a communicator adapts their communication to their audience, Clark and colleagues endeavoured to explain the underlying psychology behind making references. A central component of their theory was the role of perspective taking during communication. Inspired by earlier theorists such as Lewis (1969) and Schiffer (1972), Clark and colleagues elaborated on the importance of *mutual knowledge* for effective referential communication (H. H. Clark & Marshall, 1978, 1981; H. H. Clark & Murphy, 1982). That is, knowledge that both the speaker and listener share, with an awareness that this knowledge is shared between them. As an example, imagine that two friends (Leonie and Teresa) watched a game of rugby together on the prior weekend. When Leonie and Teresa see each other again mid-week they can converse about specifics of the game they watched together because it is assumed to be mutual knowledge by both parties. More specifically, Leonie knows that Teresa knows that Leonie knows about the game, and vice-versa. By consulting their mutual knowledge base, Leonie and Teresa can converse about specific details that would not be understandable to another person whom did not share the experience with them.

H. H. Clark and colleagues identified that reasoning about mutual knowledge could hypothetically extend to unreasonable lengths (e.g., I know that you know that I know that you know that I know, ad infinitum) (H. H. Clark & Marshall, 1978). It was proposed that this *mutual knowledge paradox* is avoided by the use of *co-presence heuristics* to assess mutual knowledge in order to
reduce perspective taking effort (H. H. Clark & Marshall, 1978, 1981). These co-presence heuristics are:

- **Physical co-presence**: People viewing the same visual scene can assume mutual knowledge of the scene.
- **Linguistic co-presence**: People having a conversation can add what has been previously stated and agreed upon as part of their mutual knowledge.
- **Cultural/Community co-presence**: People belonging to the same social group can assume with relative confidence mutual knowledge of certain things. For example, two Australians might assume that in the right context the term “barbie” refers to a barbeque, instead of the famous child doll.

These heuristics can also inform people about what is *not* mutually known. If perspectives on a visual scene differ between two people then certain elements of the scene may be unshared (Horton & Keysar, 1996). A third party that has not been part of a previous conversation will likely not share knowledge about what has previously been discussed (H. H. Clark & Schaefer, 1992). Stereotypical information associated with social groups may also serve to inform what is *not* mutually known. For example, experts in a certain domain (e.g., medicine), can assume that laypersons do not share much knowledge on the topic of their expertise (Isaacs & Clark, 1987).

H. H. Clark and Wilkes-Gibbs (1986) conducted a referential communication task experiment that replicated the previous findings of Krauss and Weinheimer (1964, 1966) and demonstrated an application of the linguistic co-presence heuristic. In this study both the director and matcher had an array of 12 shapes in front of them. Over the course of the experiment, the director described each of the 12 shapes six times. On the first mention of a particular shape, the director typically used an *indefinite reference* (e.g. “It looks like a person who is ice skating…”) with some added detail (e.g. “…and they’re sticking two arms out in front”). By the sixth mention, the director was typically using a *definite reference* (e.g. “It is the ice skater”) with no added detail, see Figure 1.3. This shift from lengthy indefinite references to short definite references has been termed the development of *conceptual pacts* (Brennan & Clark, 1996) or *linguistic conventions* (Garrod & Doherty, 1994). The development of linguistic conventions is a robust finding that has received a great deal of replication (some examples: Brennan & Clark, 1996; H. H. Clark & Wilkes-Gibbs, 1986; Fay, Garrod, Roberts, &

H. H. Clark and Wilkes-Gibbs (1986) argued that by the sixth mention, the director can state “It’s the ice skater” because she knows that her partner also thinks of that particular shape as the ice skater on account of their prior conversational history (linguistic co-presence). Between the two partners, the term *ice skater* has become part of their mutual knowledge. By consideration of what constitutes mutual knowledge between herself and her partner (i.e., perspective taking), the director can design her references appropriately. The audience also considers the perspective of the speaker as they decipher meaning. Importantly, it was argued that the development of mutual knowledge in the experiment was an inherently *collaborative* process. This is a fundamental difference between the collaborative model and prior communication theory assuming speakers and listeners act independently of one another during dialogue. The collaborative model argues that speaker and listener collaboratively negotiate meaning via a series of contributions in order to minimise their overall joint collaborative effort, instead of operating autonomously. This coordinated perspective taking results in the accumulation of a special kind of mutual knowledge between communicators that H. H. Clark and colleagues termed *common ground* (H. H. Clark & Brennan, 1991).

H. H. Clark and colleagues argued that dialogue could be conceptualised as comprising of a number of contributions, consisting of a presentation and
acceptance phase (H. H. Clark & Schaefer, 1989; H. H. Clark & Wilkes-Gibbs, 1986). Information is presented by one speaker (e.g., “It looks like a person who is ice skating and they’re sticking two arms out in front”) that can be accepted by the listener in a number of different ways: continued attention (silent acknowledgement), initiation of the relevant next contribution (conversation carries on with an implicit acceptance of what was previously said), acknowledgement (such as: head nod, wave of hand, “uh huh”, “yeah”), demonstration (one member acts upon what has been said), and display (repeating verbatim all or part of what has just been said). A contribution in dialogue may comprise of multiple presentation and acceptance phases until all parties are satisfied that they have developed a mutual understanding to a criterion sufficient for current purposes (H. H. Clark & Wilkes-Gibbs, 1986). What constitutes the type of evidence which meets the criterion of understanding can vary depending on communicative context (e.g., business meeting, versus gossiping) and individual differences (e.g., some people may require verbal confirmation more than others). This criterion becomes more stringent as the importance of mutual understanding increases. Participants engaged in a referential communication task arguably operate under a high criterion, evidenced by the relatively high number of turns and words needed to describe each shape on the initial trial. People engaged in casual conversation are likely to operate under a much lower criterion (H. H. Clark & Wilkes-Gibbs, 1986).

Successfully negotiated meaning marks the end of a contribution, and the information subsequently becomes mutual knowledge between parties in a dialogue. Clark and colleagues describe this process as grounding information so that parties in a dialogue can accumulate and build common ground (mutual knowledge) over successive contributions (H. H. Clark & Brennan, 1991; H. H. Clark & Schaefer, 1989; H. H. Clark, Schreuder, & Buttrick, 1983). H. H. Clark and Wilkes-Gibbs (1986) argued that the reduction of detail and use of definite references over repeated trials in a referential communication task is a consequence of the director consulting the common ground that has accumulated over time. More specifically, after prior collaboration that resulted in director and matcher developing a shared ‘ice skater’ conceptualisation of a particular shape, in later trials the director can simply state “the ice skater” as they consult the common ground that exists between themselves and the matcher.

A basic tenet of the collaborative model is that dialogue is not an autonomous activity as is proposed by encoder-decoder communication models
A consequence of the inherently collaborative nature of communication is that individuals whom are not part of the grounding process will be at a comprehension disadvantage. Evidence for this was provided by an experiment conducted by Schober and H. H. Clark (1989). The communication accuracy was compared for those engaged in the task versus participants listening to a recording of the interaction (over hearers) that either listened from trial 1 onwards (early over hearers) or trial 3 onwards (late over hearers). Accuracy was higher for those engaged in the task compared to early over hearers and even more so compared to late over hearers. Results were argued as evidence to support the importance of the grounding process for successful communication. Despite early over hearers receiving the same amount of information as the participants engaged in the activity, their exclusion from the grounding process put them at a comprehension disadvantage to the active participants. Late over hearers were at an even larger disadvantage as they missed out on hearing the earlier negotiation stages between the active participants. This study provides evidence consistent with the collaborative model claim that the grounding process is critical to the development of shared understanding, and those who are not part of this process are at a disadvantage (Schober & Clark, 1989).

Further evidence to support the important role of common ground was provided by Hupet and Chantraine (1992). In this referential communication task study directors referred to abstract shapes multiple times, however they did not directly interact with a matcher. Participants were explicitly told that their descriptions would be provided to the same or a different audience each time. When communicating for the same audience, participants’ number of words used across repetitions remained constant, with a small increase in the use of definite references. In the different audience condition directors produced more words across repetitions and did not use any definite references. The authors argued that in the same audience condition the directors could not collaborate to receive confirmation of understanding therefore their assumptions of common ground with the audience was limited. This explains why unlike the Clark and Wilkes-Gibbs (1986) study that allowed participants to freely interact, in the Hupet and Chantraine (1992) same audience condition the number of words did not decrease over time and the use of definite references was much less than that observed in the Clark and Wilkes-Gibbs (1986) study. Therefore the key difference between the two studies was the amount of interaction afforded to participants, which influences the opportunity to build common ground. However, even
without the possibility of confirmatory feedback, participants in the Hupet and Chaintraine (1992) same audience condition still assumed a minimal degree of common ground between themselves and the audience since they did not increase the level of detail across repetitions as was found in the different audience condition. In the Hupet and Chantraine (1992) study the participants had no specific information about their audience so any modification of communication could only be achieved via modifying the amount detail provided for the audience. Schober and Brennan (2003) have argued this to be a generic kind of adjustment whereby audience design is limited to very basic modifications to communication (e.g., more/less detail, or change in prosody/pitch) when only scant knowledge is available about the audience.

A number of studies have examined the use of community membership information to infer common ground and make generic language adjustments for the audience. A particular group or category a person belongs to can provide information about what they can be reasonably expected to know. For example: People can assume mutual knowledge with friends that strangers are not privy to (Fussell & Krauss, 1989b; Schober & Carstensen, 2010); belonging to a particular culture is associated with assumptions regarding what is commonly known within that culture (I. Y.-M. Lau, Chiu, & Lee, 2001; Zou et al., 2009); certain information is stereotypically associated with males or females (Fussell & Krauss, 1992; Senay & Keysar, 2009), different age groups (Porter & O'Sullivan, 1999), professions (Klein, Demoulin, Licata, & Lambert, 2004), and other cultures (Cohen, 1992; Leung, Lee, & Chiu, 2013); experts of a particular topic can assume they are more knowledgeable regarding their topic of expertise than laypersons (Bromme, Rambow, & Nuckles, 2001; Isaacs & Clark, 1987).

Information regarding community membership of the audience can be used to inform estimates of audience knowledge and subsequent audience design. A classic demonstration of this was conducted by Kingsbury (1968), where Kingsbury approached people on the street and asked for directions. Kingsbury either acted like a local from the area, or like someone from out of town (by talking with a foreign accent). Kingsbury found that people giving directions gave more detailed directions for someone they were led to believe was from out of town, arguably due to a perceived knowledge discrepancy by the speaker. Isaacs and H. H. Clark (1987) reported results that experts tended to simplify their language by using less jargon and also added extra detail in explanations for laypersons compared to explanations for other experts. This general finding has
also been demonstrated with medical practitioners and computer experts (Bromme, Jucks, & Runde, 2005; Bromme, Jucks, & Wagner, 2005; Bromme, Nuckles, & Rambow, 1999; Bromme et al., 2001; Nuckles & Bromme, 2002; Nuckles, Wittwer, & Renkl, 2005). Other research has found that language tends to be simplified when adults communicate with young children or infants (Henning, Striano, & Lieven, 2005; Newman-Norlund et al., 2009). Simplified communication has also been reported to sometimes occur when young adults communicate with older adults (Kemper, Finter-Urczyk, Ferrell, Harden, & Billington, 1998). All these findings have been explained in terms of a perceived knowledge discrepancy influencing audience design.

A number of studies have found that when describing the characteristics of other people, participant knowledge regarding group membership of the audience can result in emphasis of certain kinds of information (Kashima, 2014; Maass, 1999; Ruscher, 1998). Typically, when people talk with an in-group member about out-group members they emphasize stereotypic qualities (Ruscher, 1998). However when communicating to an in-group member about another in-group member, Kurz and Lyons (2009) reported that participants favoured stereotype inconsistent information over stereotype consistent information. It has been suggested that these type of findings demonstrate how the motivation to foster group solidarity can influence people to adapt their communication with in-group members to achieve a shared belief of out-group homogeneity and to differentiate in-group members (A. E. Clark & Kashima, 2007; Kurz & Lyons, 2009). Like the expert-layperson studies, this research has demonstrated how communicated information can be modified via addition/omission and emphasis/de-emphasis of certain details. This kind of broad generic audience design can be contrasted with more specific audience design whereby particular words are chosen due to their association with the perspective of a particular individual audience member (Schober & Brennan, 2003).

Research demonstrating evidence for specific partner audience design has been found using versions of referential communication tasks that use spatial stimuli. In the first of these kind of experiments, Schober (1993) had participants describe the location of a marked circle to a partner. Trials always had a second unmarked circle which forced participants to respond in a way that was either self-oriented (e.g., “It’s the one on my right”) or partner-oriented (e.g., “It’s the one on your left”), see Figure 1.4. In the task participants predominately used
partner-oriented statements, when descriptions were to be provided to another person at a later time (98% of trials), or for a co-present partner (86% of trials). Further research has replicated this kind of responding by participants in similar spatial referential communication tasks (Galati & Avraamides, 2013b; Mainwaring, Tversky, Ohgishi, & Schiano, 2003; Schober, 1995, 2009; Shelton & McNamara, 2004; Tversky & Hard, 2009).

Evidence for specific partner audience design has also been provided by studies requiring communication of conceptual information (Brennan & Clark, 1996; Wilkes-Gibbs & Clark, 1992). In these studies participants developed referring conventions with a partner over repeated references in the same manner as demonstrated in previous referential communication studies (such as: H. H. Clark & Wilkes-Gibbs, 1986; Krauss & Weinheimer, 1964). After developing referring conventions with their partner, participants finished the experiment by describing the same stimuli to a new audience, or continued on with the same partner. Compared to participants describing for the same partner, participants communicating to a new audience abandoned their conventions in some instances, and when they did use the same conventions they typically provided additional details. Therefore participants showed sensitivity to the lack of common ground between themselves and the new audience in their communicative behaviour. Brennan and Clark (1996) argued that referring conventions are linguistic pacts that are associated with particular individuals and can be flexibly abandoned or elaborated on as the communicative situation requires.
The greater the shared knowledge between people the easier it should be modify communication for the audience (Brennan, 2005). Fussell and Krauss (1989b) were interested in exploring the idea that having a great deal of shared experiences should facilitate audience design of referential descriptions. The key manipulation was that half of the participants were told their descriptions would be given to a stranger, whilst the other half were told their descriptions would be given to a close friend (these participants nominated a friend at the beginning of the experiment). Descriptions for a friend were best identified by that friend (compared to strangers), which suggests descriptions were designed specifically for the friend. Similarly, Boyle, Anderson, and Newlands (1994) found that friends performed slightly better than strangers on a referential communication task which involved explaining the route on a map.

According to the collaborative model explicit memory processes occur in parallel to perspective taking processes during dialogue. Clark and colleagues argued for the existence of reference diaries between communicators that consists of memory associations between events and objects with particular people (H. H. Clark & Marshall, 1978). In the late 1990s this viewpoint was criticized by Keysar and colleagues who argued that maintaining and updating common ground is too resource intensive, especially when there is pressure to respond in a timely manner during interactive communication (Horton & Keysar, 1996; Keysar, Barr, Balin, & Paek, 1998; Keysar, Barr, & Horton, 1998). This criticism led Keysar and colleagues to propose their monitoring and adjustment model of perspective-taking in communication.

1.1.4. Monitoring and adjustment model

Keysar and colleagues argue that perspective taking does not occur at the initial stages of language production and comprehension, but occurs as a later effortful adjustment process (Barr & Keysar, 2004; Horton & Keysar, 1996; Keysar, 2007; Keysar, Barr, & Horton, 1998). The primary evidence for this account comes from studies obtaining eye tracking measurements during referential communication tasks (Epley, Morewedge, & Keysar, 2004; Keysar, Barr, Balin, & Brauner, 2000; Keysar, Barr, & Horton, 1998; Keysar, Lin, & Barr, 2003; Shintel & Keysar, 2007). For example, Keysar, Barr and Horton (1998) had directors describe objects that had been placed in different shelves to a matcher sitting directly opposite them, see Figure 1.5. By strategically placing barriers on particular shelves the objects were in either shared (could be seen by both parties) or
privileged space (could only be seen by one party). When the director provided an instruction (e.g., “put the bottom block underneath the apple”, see Figure 1.5.) the matcher would often fixate their eye gaze upon a competitor object in their privileged space (e.g., the block on the bottom row from the matcher perspective in Figure 1.5.) before correcting their interpretation to the block in shared space (the block on the second bottom row in Figure 1.5.) and correctly complete the instruction. These findings provided evidence for an initial egocentric interpretation of an utterance followed by adjustment based on common ground as per the proposed monitoring and adjustment process.

Figure 1.5. An example of the visual world paradigm referential communication task used by Keysar and colleagues (taken from: Keysar, Barr, & Horton, 1998).

Other studies have reported that being put under time pressure acts as a situational constraint that can reduce audience design (Horton & Keysar, 1996; Robnagel, 2000, 2004). For example, in a modified referential communication task experiment conducted by Horton and Keysar (1996) directors and matchers shared a computer screen. Each half of the screen was only visible to the director or the matcher due to a physical barrier separating each half. The director’s task was to describe a clip-art image of a common and identifiable shape (e.g., circle) or object (e.g., dinosaur) that moved from their side of the screen to the matcher’s side. The experimenters manipulated the presence and type of a competitor object on each half of the screen. A present competitor object was made common ground between director and matcher by informing participants that the same item appeared for each of them. On the example shared-context trial shown in Figure 1.6.a, in order to produce an unambiguous utterance the director needed to contrast the to-be-described stimulus with the shared competitor object, by saying something like “It is a small circle”. Simply describing
what the object is (e.g., “It is a circle”) would be ambiguous for the matcher. On the privileged-context example trial shown in Figure 1.6.b, the director only needs to say “It is a circle”, since the extra information in the description “It’s a small circle” would not be necessary to disambiguate the utterance. When not under any time pressure directors behaved as expected by including disambiguating information when necessary and not including it when unnecessary. When under time pressure directors were less likely to use disambiguating information on trials when it was necessary, and more likely to include disambiguating information on trials when it was not necessary. Therefore, results suggested that directors were less sensitive to the audience under time pressure and findings were argued to support a monitoring and adjustment perspective taking process underlying audience design (Horton & Keysar, 1996).

Figure 1.6. Images taken from Horton and Keysar (1996) (a) An example of a shared context trial (b) An example of a privileged context trial.

1.1.5. Interactive alignment model

Another account of communication arguing for the importance of egocentric processes during dialogue is the interactive alignment model (Garrod & Pickering, 2004, 2009; Pickering & Garrod, 2004, 2006). This account was inspired by research that has found mimicry to be important for social perception and action. For example, people have a strong tendency to imitate the posture and movements of the person whom they are interacting with (The chameleon effect: Chartrand & Bargh, 1999). Also, neuroscientists have discovered that when
perceiving movement and/or communication of others the brain regions associated with performing those activities are activated within the observer (Mirror neurons: Gallese & Goldman, 1998; Rizzolatti & Craighero, 2004). Naturalistic and experimental studies have shown that communication consists of a great deal of imitation (Pickering & Ferreira, 2008). That is, during communication people usually become more similar or align how (e.g., pitch and pause duration) and what (discourse topic) they communicate. This idea is not new, exemplified by the notion of convergence in communication accommodation theory (Giles et al., 1991; Giles & Gasiorek, 2012).

However an important difference between the interactive alignment model and previous theories is the interactive alignment model emphasis upon unconscious processes during dialogue. In an early referential communication task, Garrod and Anderson (1987) noted that there appeared to be a lot of mimicry evident in the task discourse, arguing that participants in the task were communicating via an output/input principle. Participants in the Garrod and Anderson (1987) experiment played a maze game where players worked together to reach a goal on their respective mazes. Mazes were a series of boxes that the players needed to move between in order to reach their goal. Communication was required between players to achieve their goals because of the inclusion of gates that blocked movement that could only be opened by the other player moving into a certain switch box on their maze. The output/input principle was coined based on the observation that communication between players was tightly coupled as an utterance (output) of one player would closely resemble the linguistic features (e.g., word choice and syntactic structure) of the immediately preceding utterance (input) from the other player.

Pickering and Garrod (2004, 2006) later argued that the development of linguistic conventions is driven by basic resource free priming mechanisms rather than any assumptions about common ground. A conventional way of referring (such as “the ice skater”) is argued to be a temporary dialogue routine that has been established by way of repeated implicit priming and is produced as an egocentric utterance rather than constituting any audience design by the speaker (Pickering & Garrod, 2005). Therefore, Pickering and Garrod (2005) have argued that communication that at face value might seem like deliberate audience design could instead be produced without any consideration of the audience. According to Pickering and Garrod (2004, 2006), common ground only plays a role when repairing misunderstandings that become apparent. Therefore, similar to Keysar
and colleagues common ground is viewed as an effortful secondary process to initial egocentrism. However dissimilar to Keysar and colleagues, the interactive alignment model argues that common ground only need be consulted rarely and this accounts for why ordinary conversation is found by most to require little effort (Garrod & Pickering, 2004).

1.1.6. Memory resonance model

The importance of unconscious priming-like processes for communication has also been argued for by researchers William Horton and Richard Gerrig (Horton, 2007; Horton & Gerrig, 2002, 2005a, 2005b; Horton & Slaten, 2012). These researchers have argued that memories for individual people act as cues for a range of interconnected pieces of information (i.e., the associations formed between particular people and particular memories of places, events, and other people). During communication implicit memory resonance causes certain memories to be more readily accessible that will influence the formulation of utterances (Horton, 2007). Therefore, like the interactive alignment model, the memory resonance approach of Horton and Gerrig argues for the importance of implicit priming. However, the concept of memory resonance places more emphasis upon how consideration of the audience (either implicitly or explicitly) drives communication. Horton and Gerrig argue that audience design is an outcome of typical memory processes (Horton, 2007). By this account audience design does not need to be considered as some special after thought of the communication process as suggested by both the monitoring and adjustment and interactive alignment models.

A referential communication study conducted by Horton and Gerrig (2002) provided evidence for the formation of memory associations between referential terms and a particular audience. For the first few rounds (1-3) the director described 18 pictures consisting of fish, flowers and abstract shapes to two matchers. The two matchers (A & B) each had 12 different collections of pictures. Therefore, during the early rounds some of the pictures were shared between the director and matcher A, whilst others were shared with matcher B. In later rounds, the director communicated the pictures again to only one matcher at a time in order to assess whether the directors were sensitive to the distinction between shared and non-shared pictures. The director continued with matcher A for rounds 4-6, and then matcher B for rounds 7-9. It was found that the directors were sensitive to the status of prior shared and non-shared pictures.
with the matchers by typically using more detail, more hedges (e.g., sort of, kind of, -ish), and more overall reconceptualisation of descriptions when the picture was not shared previously. Results therefore provided evidence for the presence of explicit (or implicit) memory associations between different linguistic conventions with separate audience members as per the memory resonance proposal.

Other research that has discriminated between explicit and implicit memory processes during referential communication has been conducted by researchers comparing patients with localised brain damage to controls. Melissa Duff and colleagues investigated the referential communication of amnesic patients (Duff, Hengst, Tranel, & Cohen, 2006). Specifically, these researchers recruited patients with hippocampus damage that impairs relational memory binding meaning that they have difficulty forming new memories. Participants in this study were profoundly impaired in a word learning task that required participants to learn arbitrary labels for abstract shapes. This was consistent with their amnesia symptoms. However, when performing a referential communication task as the director (with a familiar partner) the amnesic patients showed the typical reduction in words and convergence of perspective across repeated trials. For example, for one shape an amnesic director and their partner converged from the earlier description “The guy that’s slumped over sleeping or reading a book or something, kind of siesta time?” upon the label “siesta man”, after six repetitions. The authors argued that collaborative learning caused the amnesic patients to alter their perception of the shapes so that over time they began to conceive them from a certain perspective. The findings of this study question the need for shared memory representations underlying the development of referring conventions, instead supporting a more egocentric account (Duff et al., 2006; Wu & Keysar, 2007).

However, Duff and colleagues re-examined their findings and reported that the healthy comparison participants displayed some high-level discourse features that were conspicuously absent in the amnesic participants. This included

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1 A later study revealed that amnesic patients do have difficulty developing collaborative labels for abstract shapes when the set of shapes used have a high level of similarity (Duff, Warren, et al., 2011). The authors argued that the hippocampus has an important neurological function of pattern separation. In other words, more similar stimuli increases task difficulty by requiring participants to hold multiple possible interpretations of the shape in memory to enable the production of descriptions that can uniquely identify a particular shape.
the acknowledgement and use of multiple perspectives, and mentioning prior experience and knowledge as part of the collaborative process (Duff, Hengst, Tranel, & Cohen, 2008). The authors argued that while the development of labels over time may not require explicit common ground, it appears that it is required for higher level discourse features. Further evidence for this proposition comes from qualitative analysis of conversation between amnesic individuals and clinicians revealing that although amnesic individuals performed adequately for procedural and linguistic-based measures, they showed impairment for more social aspects of language (e.g., shifting social stance) (Duff, Hengst, Tengshe, et al., 2008).

Further re-examination and subsequent replication of the Duff et al. (2006) study revealed that the amnesic directors exhibited significantly less, and inconsistent use of definite reference as directors compared to the control group participants (56% versus 90% respectively) (Duff, Gupta, Hengst, Tranel, & Cohen, 2011), see Figure 1.7. Additionally, the normal functioning partners of the amnesic participants were also found to use less definite references when acting as directors compared to control group participants (48% versus 95% respectively) (Duff, Hengst, Gupta, Tranel, & Cohen, 2011). Duff and colleagues have argued that their findings suggest that amnesic participants are able to collaboratively learn labels for the shapes over repeated reference, via implicit procedural memory processes. However these same participants show an impaired ability to signify that the label is common ground between themselves and their partner via the use of definite reference, via explicit declarative memory processes (Duff & Brown-Schmidt, 2012; Duff, Gupta, et al., 2011; Duff, Hengst, et al., 2011; Kurczek & Duff, 2011).
Figure 1.7. Table taken from Duff, Gupta, et al. (2011). This table shows the descriptions used by an amnesic director for the shape shown at the bottom right of the table over the final 12 trials of the experiment (the experiment consisted of 24 trials in total across four sessions). Notice how at session 3, trial 1 (13th trial) the participant uses the definite reference “the barn”, and then subsequently uses an inconsistent pattern of definite and indefinite expressions for the remainder of the experiment finishing the experiment with an indefinite reference in session 4, trial 6 (24th trial) “a barn with a roof on the silo”. This contrasts sharply with healthy comparison participants whom consistently used definite reference such as “the barn” (>90% after trial 3; 99% on trial 24).

Using eye tracking during referential communication Duff and colleagues have also reported that amnesic participants can immediately incorporate common ground into comprehension. However, with a brief time delay (~40s), participants became severely impaired due to their declarative memory deficit (R. D. Rubin, Brown-Schmidt, Duff, Tranel, & Cohen, 2011). Additional studies have provided evidence to suggest that the hippocampus plays a role for fast relational binding during language comprehension, but not in all circumstances (Kurczek, Duff, & Brown-Schmidt, 2013; Trude, Duff, & Brown-Schmidt, 2014). Duff and colleagues have argued that their research provides evidence for the role of both implicit (procedural) and explicit (declarative) memory processes during language production and comprehension (Duff & Brown-Schmidt, 2012; Trude et al., 2014). Therefore, this research supports Pickering and Garrod’s argument for the role of implicit priming (Pickering & Garrod, 2013), and also Clark and colleagues argument for the role of explicit common ground (H. H. Clark & Brennan, 1991). Furthermore, it supports the arguments of Horton and colleagues that both implicit and explicit memory processes are integrated and important for successful human communication, instead of one process being dominant (Horton, 2007; Horton & Gerrig, 2005a).
1.1.7. The current state of *audience design* in communication theory

Previous sections have discussed the different views on the role of audience design during interpersonal communication. Audience design has been neglected (e.g., encoder-decoder model), viewed as central (e.g., collaborative model), viewed as secondary (e.g., monitoring and adjustment model), viewed as absent (e.g., interactive alignment model), and recently again viewed as central (e.g., memory resonance model) in communication theory. Despite recent theorizing about the role of unconscious processes such as priming and implicit memory resonance, researchers continue to argue for the important role explicit audience design has in communication (Bezuidenhout, 2013; Blokpoel et al., 2012; Brennan, Galati, & Kuhlen, 2010; Brennan & Hanna, 2009; Echterhoff, Higgins, & Levine, 2009; Galati & Brennan, 2010; Gann & Barr, 2012; Newman-Norlund et al., 2009; Wittwer et al., 2010).

Several referential communication studies have shown that participants are sensitive to common ground by maintaining referring conventions with old partners whilst using entirely new descriptions or providing additional detail with new partners (Brennan, Schumann, & Batres, 2013; Galati & Brennan, 2010; Gann & Barr, 2012; Gorman, Gegg-Harrison, Marsh, & Tanenhaus, 2013; Yoon & Brown-Schmidt, 2014). Furthermore, eye tracking studies have reported immediate partner-specific effects for comprehension of utterances (Brown-Schmidt, 2009; Brown-Schmidt & Hanna, 2011; Hanna & Brennan, 2007; Hanna & Tanenhaus, 2004; Hanna, Tanenhaus, & Trueswell, 2003; Horton, 2007; Horton & Slaten, 2012; Metzing & Brennan, 2003; Nadig & Sedivy, 2002). For example, Metzing and Brennan (2003) found that it took participants longer to look at and touch referent objects when their partner broke a conceptual pact. That is, for an item previously termed “space man” when the partner changed expression to “blue guy” participants would take longer to look at and touch the referent. However this did not occur if a new partner used a new expression which suggests that participants are associating the particular expression with a particular partner.

More research is needed to further clarify the time course of partner processing during language, and the precise role of implicit and explicit memory processes underlying audience design. Regardless, the accumulated experimental evidence suggests that audience design plays a role in interpersonal communication, but when and the extent to which it contributes to interpersonal communication is not entirely clear. As discussed, different communication theories place different emphasis upon the role of audience design for successful
communication. Some models argue that communication is largely allocentric and therefore primarily strategic, such as the collaborative model of Clark and colleagues, and memory resonance account of Horton, Gerrig, and colleagues. Other models argue that communication is largely egocentric therefore primarily non-strategic such as the monitoring and adjustment model of Keysar and colleagues, and interactive alignment model of Garrod, Pickering, and colleagues. By exploring the influence of a number of situational factors this thesis examines under what circumstances people are more or less likely to engage in audience design. Indeed, there have been multiple recommendations by authors over the years for more investigation into factors that influence audience design (Brennan & Hanna, 2009; Horton & Gerrig, 2002; Krauss & Fussell, 1996; Schober & Brennan, 2003). The current thesis adds to the audience design research literature by conducting experiments to further investigate a number of factors that prior literature has identified as influencing audience design during communication.

1.2. Factors that influence audience design investigated in this thesis

There are many factors that can impact communication by reducing or increasing the motivation and/or opportunity to engage in audience design (Gann & Barr, 2012; Krauss & Fussell, 1996; Schober, 1998; Schober & Brennan, 2003). The communication process can be impacted by personal characteristics of the message producer and receivers, such as age, gender, nationality, and topic expertise, among other things. It can be impacted by the purpose of communication, such as informing, flirting, joking, chastising, and arguing, among other things. Finally, it can be impacted by characteristics of the communication medium, such as face-to-face, email, phone text-messaging, and giving a presentation, among other things. The experiments reported in this thesis use a version of a traditional referential communication task paradigm. The primary purpose of communication in each of the experiments was for the message producer to be as informative as possible for the designated audience. The particular factors examined are limited to those that have had some prior investigation in order to enable adequate specificity and confidence in hypotheses and conclusions. These factors are: audience size, level of interaction, audience composition, estimates of communicative effectiveness, and age. A brief introductory rationale for the subsequent experimental chapters is given next.
1.2.1. An overview of Chapter two: Investigating the impact of interaction and audience size upon audience design

The second chapter of this thesis consists of three referential communication experiments that investigate whether the size of the audience is a factor influencing audience design. Fay, Garrod and Carletta (2000) have argued that people can be sensitive to the size of the audience when constructing messages, and that more effort may be put into messages for a larger audience. That is, increasing audience size promotes audience design. This simple relationship is thought to occur as people realise that with increasing audience size there will likely be an increase in the number of distinct perspectives present in the audience, and therefore more effort will be required to adequately cater to multiple perspectives. This simple premise is examined in a series of experiments presented in chapter two of this thesis. In the first experiment participants were asked to describe abstract shapes that would be provided at a later time to themselves, or an audience of one, five, or ten other people. This first experiment was conducted in order to examine whether more effort would be put into descriptions as the audience size increased.

Additionally, in a second experiment participants communicated with a co-present audience (interactive) in order to examine the influence of interactive processes upon communication for different sized audiences. Communication can be highly interactive such as face-to-face conversation, less interactive when text-messaging over a phone or when using chat programs like Facebook, even less interactive when giving a speech, or not at all interactive when writing a letter. When using text chat communication the degree of interaction varies depending on the rate of reply of the people engaged in the conversation, and giving a speech may seem completely non-interactive however the reaction of the audience (e.g., frowns or looks of puzzlement) can provide a minimal level of feedback. The availability of feedback can facilitate or inhibit audience design. Feedback facilitates audience design by providing information about the audience’s knowledge, or level of comprehension as argued by the collaborative model of communication (H. H. Clark, 1996; H. H. Clark & Brennan, 1991; H. H. Clark & Krych, 2004; Krauss & Fussell, 1991, 1996).

Feedback can also reduce the need for audience design. Instead of designing messages, people can use their own perspective and rely on their audience to alert them of any confusion, which can then be repaired if need be as argued by the monitoring and adjustment model of communication (Keysar, 2007;
Furthermore, unconscious priming is a mechanism that can operate during interactive communication to align perspectives of communicators without the need for effortful perspective taking as argued by the interactive alignment model of communication (Garrod & Pickering, 2004, 2009; Pickering & Garrod, 2004, 2006). It is generally accepted that without any opportunity for feedback the message producer needs to put more effort into designing their message (Gann & Barr, 2012). The degree of effort that is possible will depend on the amount and type of knowledge available about the audience.

Therefore, because the degree of interaction is a factor that has previously been identified as impacting audience design behaviour it was desirable to remove this influence during the first experiment conducted in chapter two. A second experiment is then reported that allowed directors to freely interact with the audience that varied in size (one, two, or four people). This therefore allowed for a comparison of communication to different sized audiences when interaction was controlled, or not controlled. Finally a third experiment recruited naïve participants to match the descriptions produced by directors from experiments one and two. This further qualified findings by assessing the comprehension of descriptions, as the clarity of descriptions could provide further evidence to support whether descriptions had been adequately designed or not. Therefore, the second chapter of this thesis adds to the audience design literature by extending upon the experimental findings of Fay et al., (2000) examining group size as a factor influencing audience design, and at the same time exploring the influence of interactive processes within a group context.

1.2.2. An overview of Chapter three: Investigating the impact of audience size and majority influence upon audience design

The series of experiments reported in chapter two investigated how increasing the size of an audience can influence audience design. However groups can also vary in their composition. There can often be a dominant perspective present in a group. For example, consider either a group of sawmill workers, or a group of environmental activists discussing modern logging practices. The dominant perspective amongst the sawmill workers would be that logging is a positive endeavour, contrasted with the environmentalists who perceive the activity as negative. As social animals human beings have been found to be extremely sensitive to the presence of a dominant perspective in a group (Cialdini
& Goldstein, 2004). A dominant perspective can inform people about group norms and expectations (Cialdini & Trost, 1998). Communicating acceptance of perceived group norms can facilitate feelings of belongingness and enhance group cohesion (A. E. Clark & Kashima, 2007). Therefore group composition is likely to be a factor that influences audience design as people are typically inclined to communicate in a way that is consistent with the dominant perspective of a group (A. E. Clark & Kashima, 2007). The aim of chapter three was to investigate the potential of a dominant perspective present in an audience to facilitate audience design in a referential communication task.

In the experiments reported in the second chapter of this thesis, the only prior information made available to participants was the audience size. Without any additional information regarding the perspective of audience members the participants were limited to simply including more or less detail in their messages. In order to test the impact of a dominant audience perspective upon audience design it was necessary to make participants aware of the presence of a dominant perspective by clearly informing the participants of the audience perspectives prior to the participants producing descriptions for the audience. In this experiment a more detailed examination of audience design behaviour was possible by examining the content of participant descriptions to assess whether they had adopted the dominant audience perspective in their descriptions for that audience, or whether they simply re-used their own personal perspective. Therefore the experiment presented in chapter three extended upon the investigation of chapter two by examining if increasing the size of the audience will facilitate audience design when the perspectives present within the audience are made explicit to the message producer. The experiment additionally adds to the audience design literature by examining the influence of a dominant audience perspective upon communication in a referential communication task as this has not been previously examined.

1.2.3. An overview of Chapter four: Investigating the impact of estimates of communicative effectiveness and age upon audience design

In the final experimental chapter, the referential communication methodology used in chapter three is extended to investigate another factor that influences audience design – estimates of communicative effectiveness. Early research provided evidence to suggest that estimation of audience knowledge influences audience design (Fussell & Krauss, 1992; I. Lau, Chiu, & Hong, 2001). In
these studies, perceived stimulus identifiability was significantly related to the amount of detail in descriptions written for a generic audience. That is, to-be-described stimuli perceived to be less identifiable caused participants to produce more informative messages. For example, Fussell and Krauss reported that how easily recognizable participants believed famous people from the time (e.g., Clint Eastwood, George Bush, Judd Nelson) were for people in general, was strongly associated with the amount of detail included in descriptions (of the famous people) intended for others to understand. However, when estimating what others know people are typically biased by their own knowledge (Nickerson, 2001). That is, people tend to over-estimate the commonality of their own knowledge, which has been called the false consensus effect (Krueger, 2007; Marks & Miller, 1987; Ross, Greene, & House, 1977). Over-estimating the commonality of one’s own knowledge has been found to inhibit audience design in expert-layperson communication (Bromme, Jucks, & Runde, 2005; Bromme et al., 2001). Some researchers have referred to the inhibitory effect of the false consensus effect on audience design in expert-layperson communication as the curse of expertise (Hinds, 1999; Hinds, Patterson, & Pfeffer, 2001).

Another form of estimation that may act to inhibit audience design is estimates of communicative effectiveness. This is because people typically have an illusion of transparency (Gilovich & Savitsky, 1999; Gilovich, Savitsky, & Medvec, 1998). That is, people are generally biased to believe their own perspective is more understandable to others than what it really is. This can cause people to over-estimate the effectiveness of their communication (Fay, Page, & Serfaty, 2010; Fay, Page, Serfaty, Tai, & Winkler, 2008; Keysar & Henley, 2002; Kruger, Epley, Parker, & Ng, 2005; Van Boven, Gilovich, & Medvec, 2003). Over-confidence in one’s communication can arguably diminish incentive to actively design messages for the audience (Kruger et al., 2005). For example, Schober and Carstensen (2010) compared the performance of married couples with pairs of strangers on a referential communication task and found that married couples did not develop linguistic conventions with any more efficiency than pairs of strangers, even though the married couples felt more confident in their ability. Similarly, Savitsky, Keysar, Epley, Carter, and Swanson (2011) reported that participants communicating ambiguous statements overestimated their communicative success more with friends or spouses compared to strangers. Additionally when following directions from a friend (compared with strangers) the participants tended to make more egocentric errors (look at and reach for an
Savitsky et al., (2011) concluded that there appears to be a *closeness communication bias* where people monitor the perspective of strangers however they let down their guard when communicating to a friend and instead rely on their own perspective since it is assumed a great deal of knowledge is shared.

Conversely, under-confidence in one’s communication might increase incentive to adopt the perspective of the audience. In the experiment conducted in chapter four, participants were first asked to create personal descriptions for abstract shapes. Subsequently participants were provided with a list of descriptions for the same shapes that were produced by another participant (person X). Participants were then asked to choose a description to provide to person X for each shape, either their own personal description, or the description produced by person X. After choosing descriptions for all shapes, participants estimated whether they believed a random other person would have been able to successfully understand the descriptions (both their personal descriptions, and those of person X) with a simple yes/no response. This enabled an investigation of any potential influence of perceived communicative effectiveness of the descriptions upon their communicative choices in the task. This experiment adds to the literature on audience design by investigating the impact of perceived communicative effectiveness in a task that clearly distinguishes between the perspective of the participant, and that of the audience.

Age was an additional factor examined in chapter four by comparing across groups of younger and older adults. The ability to appreciate the perspective of other people develops over childhood (Flavell, 1999), and with it also develops the ability to communicate (Nilsen & Fecica, 2011; Roberts & Patterson, 1983; Slomkowski & Dunn, 1996). It has been argued that not only the ability to appreciate another perspective, but also the ability to inhibit one’s own perspective is important when thinking about, and communicating with others (Birch & Bloom, 2003, 2004). A decline in perspective inhibition in older adulthood has been used to explain research findings that older adults engage in less audience design compared to younger adults (Arbuckle & Gold, 1993; Hupet, Chantraine, & Nef, 1993). Other researchers have appealed to a decline in memory in older adulthood to explain similar findings (Horton & Spieler, 2007). The experimental design used in chapter four does not place any memory demands upon participants, and therefore can add to the audience design.
literature by providing evidence for or against different explanations of reduced audience design behaviour in older adults.

1.3. Summary

This thesis explores several factors that may influence audience design. Despite multiple recommendations by authors over the years for more investigation into factors that influence audience design, it is a neglected area of research (Brennan & Hanna, 2009; Horton & Gerrig, 2002; Krauss & Fussell, 1996; Schober & Brennan, 2003). The first study reported in this thesis investigates whether an increase in group size influences audience design, and also explores the role of interaction/feedback. The second study revisits audience size and also explores how a majority perspective (or lack of) within a group influences message construction. The third study examines the influence that estimations of communicative effectiveness have upon audience design, and also compares younger and older adult groups. This thesis therefore adds to the audience design research literature by exploring in depth some factors that influence audience design. How these findings relate to the communication theories described in this introduction will be further discussed in the subsequent chapters.
2. Investigating the impact of interaction and audience size upon audience design

2.1. Foreword

The three experiments reported in this chapter have been published as a paper in a peer-reviewed journal, and is included in this thesis as Chapter 2. The wording is identical to the published journal paper -


2.2. Abstract

This paper contrasts two accounts of audience design during multi-party communication: audience design as a strategic individual-level message adjustment or as a non-strategic interaction-level message adjustment. Using a non-interactive communication task, Experiment 1 showed that people distinguish between messages designed for oneself and messages designed for another person; consistent with strategic message design, messages designed for another person/s were longer (number of words) than those designed for oneself. However, audience size did not affect message length (messages designed for different sized audiences were similar in length). Using an interactive communication task Experiment 2, showed that as group size increased so too did communicative effort (number of words exchanged between interlocutors). Consistent with a non-strategic account, as group members were added more social interaction was necessary to coordinate the group’s collective situation model. Experiment 3 validates and extends the production measures used in Experiment 1 and 2 using a comprehension task. Taken together, our results indicate that audience design arises as a non-strategic outcome of social interaction during group discussion.

2.3. Introduction

Audience design, or recipient design, is the process of speech adaptation to accommodate an addressee (Bell, 1984; Sacks, Schegloff, & Jefferson, 1974). While ‘design’ implies a thoughtful and strategic process of linguistic adjustment,
it is equally possible that such adjustment is thoughtless and non-strategic (for a
discussion of deliberative and non-deliberative thinking see Kahneman, 2011).
When and the extent to which people consider the beliefs and knowledge of their
audience during message design is a contentious issue (Brennan & Hanna, 2009;
situational factor that promotes strategic audience design; speakers faced with
larger audiences produced more informative messages (i.e., longer and more
detailed messages that were easier for others to understand). This paper
experimentally examines the extent to which people strategically design their
message for different sized audiences, and contrasts this with an alternative
account; that audience design arises as a non-strategic outgrowth of social
interaction during group discussion. In other words, the behavioural studies
reported here examine the extent to which audience design is a strategic, top-
down and individual-level design process or a non-strategic, bottom-up and
interaction-level process.

Classical theories of communication argue that audience design involves
strategic adjustments in communication that are intentionally designed to meet
the informational needs of one’s addressee (H. H. Clark & Carlson, 1982; Grice,
1975; Levelt, 1989). These theories postulate that perspective-taking plays a
crucial part in the strategic design of successful messages; people consider their
addressee’s perspective (beliefs and knowledge) when constructing their
message, and the feedback they receive allows them to update and refine this
perspective. The development of a shared perspective, or situation model, allows
interlocutors to reduce their collaborative effort (i.e., produce increasingly
succinct messages that are tailored to their addressee’s informational needs; H. H.
Clark & Wilkes-Gibbs, 1986). On this account speakers have a model for specific
addressees, and access this model when designing their message. This is
supported by an empirical study showing that interlocutors develop ‘conceptual
pacts’, addressee-specific agreements about how to label objects (Brennan &
Clark, 1996).

By contrast, non-strategic accounts claim that people pay little attention
to the perspective of their addressee during language processing. Empirical
studies indicate that speakers use particular syntactic structures to ease sentence
production rather than to benefit addressee comprehension (Ferreira & Dell,
2000) and that addressees initially interpret utterances from their own
perspective rather than taking the speaker’s perspective (Epley et al., 2004). The
interactive alignment model (Pickering & Garrod, 2004) offers an alternative non-strategic account of how ‘conceptual pacts’ might arise. On this account, interlocutors adopt the same labels (and other aspects of linguistic representation, including prosody and syntax) as their partner via priming processes that operate during conversation. Linguistic representations produced by the speaker automatically activate similar representations in the addressee, and these representations retain enough activation such that when it is the addressee’s turn to speak they are reused (and readily understood by the previous speaker). Unlike the strategic and computationally costly classical theories, the interactive alignment account stresses the role of non-strategic and computationally cheap priming.

The interactive alignment model argues that linguistic entrainment is automatic and implicit, a non-strategic outcome of interactive priming between interlocutors. However, and consistent with classical theories, beliefs about one’s addressee can mediate linguistic entrainment. For example, stronger lexical entrainment is observed when participants believe they are playing a picture naming game with a computer as opposed to a human (Branigan, Pickering, Pearson, McLean, & Brown, 2011). Even stronger entrainment is observed when participants believe they are interacting with a less capable computer, suggesting that beliefs about an addressee’s communicative capacity can affect alignment in dialogue. Similarly, Kingsbury (1968) showed that responses to requests for directions were longer and more detailed when the requester was perceived as being from out-of-town rather than a local. Similar strategic addressee-specific adjustments are seen in expert-layperson dialogue, indicating that beliefs about the expertise of one’s addressee can affect message design (Nuckles et al., 2005).

Another situational factor that can affect message design is group size. Naïve overhearers are found to better understand what was agreed during ten-person group discussions when compared to smaller five-person discussions (Fay et al., 2000). Fay et al (2000) reasoned that speakers in the larger discussion groups were more sensitive to their broader audience, and engaged in more thorough message design to ensure the greater variety of perspectives contained in the larger group were catered to. This is consistent with audience design as a strategic individual-level process. However, and as noted by Fay et al, the dynamics of the different sized discussions were very different; small group discussions were more interactive than large group discussions (characterised by more frequent speaker switching, shorter speaker turns and more interruptions).
Thus, an alternative hypothesis is that overhearers’ better understanding of what was agreed during the larger group discussions arose not because of strategic adjustments during message formulation, but arose instead on account of the different communication dynamics prevalent in small and large group discussions. For instance, it is quite possible that overhearers’ better comprehension of what was agreed in the larger group discussions resulted from hearing a broader range of perspectives on the topic under discussion. This competing explanation is consistent with audience design as a non-strategic interaction-level process.

The experiments reported here try to tease apart these competing explanations of audience design during multiparty communication. Using a non-interactive referential communication task, Experiment 1 tests if participants exert more effort (i.e., produce longer messages) when communicating to a larger group. By using a non-interactive task, Experiment 1 controls for multiparty communication dynamics, allowing for a test of the extent to which audience design reflects strategic individual-level message design. Experiment 2 uses an interactive referential communication task to study the effect of multiparty communication dynamics on audience design. This allows us to test if non-strategic interaction-level processes can explain the pattern of results observed by Fay et al (2000). Experiment 3, using an overhearer-type paradigm, validates and extends the results of Experiments 1 and 2.

2.4. Experiment 1

To test if people strategically design their messages to meet the informational needs of their audience Fussell and Krauss asked participants to write descriptions for a range of abstract shapes where the intended audience was either themself or a stranger (Fussell & Krauss, 1989a), or a friend or a stranger (Fussell & Krauss, 1989b). As predicted, messages designed for another person were longer (in words) and more accurately decoded by strangers compared to messages designed for oneself (which included more idiosyncratic shape descriptions). Furthermore, messages designed for a friend (i.e., a specific other) were more accurately decoded by that friend when compared to a stranger (i.e., a generic other). These findings indicate that people can strategically design their messages to meet the informational needs of their audience.

Experiment 1 extends these studies to determine if people make similar strategic message adjustments based upon their size of their target audience. Like Fussell and Krauss (1989a, 1989b) a non-interactive task is used in which
participants write descriptions for a range of abstract geometric shapes. Audience size is manipulated by telling participants that their descriptions are for themselves (Self), or for One, Four, or Nine other people (i.e., a 2-Person, 5-Person or 10-Person group, including the participant). Like Fussell and Krauss (1989a) participants were not given any specific information about the audience aside from its size. Thus, in the context of Experiment 1, strategic audience design is a broad adjustment in response to audience size as opposed to individually tailored addressee-specific adjustments. As discussed, a non-interactive task is used to eliminate interaction-level processes.

If audience size is a strategic consideration during message design, then participants will exert more communicative effort when producing messages for larger audiences (as the number of potentially differing perspectives in the group increases). This will be reflected by longer messages (in words) as group size increases. This pattern of results would support audience design as a strategic individual-level adjustment.

2.4.1. Method

2.4.1.1. Participants
One hundred undergraduate students from the University of Western Australia participated in exchange for partial course credit or payment. All were native English speakers.

2.4.1.2. Stimuli
Eighteen abstract geometric shapes were used as stimuli (4 example shapes are given in Figure 2.1.). This type of stimuli is frequently used to study language processes (e.g., H. H. Clark & Wilkes-Gibbs, 1986; Duff, Warren, et al., 2011; Fox Tree, 1999; Horton & Gerrig, 2002; Schober & Clark, 1989).

![Figure 2.1. Examples of the geometric shapes used as stimuli in the current study.](image)

2.4.1.3. Procedure
Participants were randomly allocated to one of four conditions, with 25 participants in each. In each condition participants (henceforth referred to as
'directors' using Clark and Wilkes-Gibbs' 1986 terminology) wrote descriptions into a Microsoft word document for each of the 18 geometric shapes (presented within the same Microsoft Word document) for either Self, One, Four or Nine other people (i.e., Self, 2-Person, 5-Person or 10-Person group). Directors in the self condition were instructed to write a description for each shape that would allow them to identify the target shape from the description. Directors in the Other conditions were asked to write descriptions that would allow One, Four or Nine others to pick out the intended geometric shape from its description. In each condition directors completed the task four times, with the array of shapes presented in a different random order on each game. This allowed us to examine the extent to which descriptions changed (e.g., became more succinct) over repeated reference.

2.4.2. Results and Discussion

Message length (in words) was used to measure communicative effort. This is a standard measure of audience design, where longer messages indicate more strategic message adjustments (Fussell & Krauss, 1989a, 1989b; Kingsbury, 1968; Krauss & Fussell, 1991, 1996). Directors used shorter messages when the intended recipient was oneself compared to when the message was designed for another person/s. Audience size did not affect message length; messages designed for One, Four or Nine others were of a similar length. In each condition messages became increasing succinct over repeated reference (see Figure 2.2.). These observations were confirmed by ANOVA.

Message length (in words) was entered into a mixed design ANOVA that treated Group Size (Self, 2-Person, 5-Person, 10-Person Group) as a between-participant factor and Game (1-4) as within. This retuned a main effect of Group Size [F(3,96) = 4.76, p < .01, η² = .13] and Game [F(3,288) = 30.19, p < .01, η² = .24]. The Group Size by Game interaction was non-significant (p = .98). The main effect of Group Size results from those in the Self condition using shorter messages to describe each shape compared to those in the other conditions (between-participant ts(48) > 3.14, ps < .01, ds > .89). There was no difference in the length of messages used to describe each shape in the 2-Person, 5-Person and 10-Person Group Size conditions (ps > .63). Each level of Group Size showed a reliable decrease in message length across Games [one-way within-participant ANOVAs, Fs(3,22) > 3.10, ps < .05, η²s > .28].
This study asked if group size is a strategic individual-level consideration when constructing a message. Controlling for interaction-level processes, our results indicate that participants distinguished between the self and other; messages for another person/s were longer than those designed for oneself. This finding replicates Fussell and Krauss (1989a). However, group size did not affect audience length; messages for different sized audiences were of a similar length. Our results suggest that participants made strategic individual-level message adjustments based upon whether the destination of their message was themselves or someone else. Contrary to Fay et al (2000) this did not extend to different sized audiences (where messages were of a comparable length). The finding that participants reduced their communicative effort over repeated reference is consistent with other referential communication studies (H. H. Clark & Wilkes-Gibbs, 1986; Fay, Garrod, et al., 2010; Garrod, Fay, Lee, Oberlander, & MacLeod, 2007; Krauss & Weinheimer, 1964; Schober & Clark, 1989).

Controlling for interaction-level processes, Experiment 1 found no evidence to indicate that group size affects strategic audience design. By using an interactive referential communication task, Experiment 2 examines the effect of non-strategic interaction-level processes on audience design during group discussion.

2.5. Experiment 2

Larger groups tend to contain a greater diversity of perspectives compared to smaller groups. The increase in the potential number of knowledge discrepancies increases the coordination problem in larger groups (Steiner, 1972).
Consequently, members of larger groups tend to work harder to achieve mutual consensus, or coordinate their collective situation model (Anderson, 2006). The more elaborate coordination process in larger groups may have benefitted the over hearers in the Fay et al (2000) study. With more perspectives to coordinate (or knowledge discrepancies to reconcile), it is likely that non-active group members are exposed to more perspectives on the topic under discussion. For instance, in the current task larger groups may negotiate several possible ways to describe each shape (e.g., the leftmost shape in Figure 2.1. was referred to as the “ice skater”, “ballerina”, “T man”, “piranha fish” by different participants) before a particular description type is accepted.

Experiment 2 examines non-strategic audience design using an interactive referential communication task. Experiment 2 asks if the greater knowledge discrepancy typical of larger groups requires more extensive social coordination. Participants communicated with other members of their group (2-person, 3-person or 5-person) using a text chat tool that allowed them to interact in writing with their addressee/s over a computer network.

2.5.1. Method

2.5.1.1. Participants
Two hundred and fifty undergraduate students from the University of Western Australia participated in exchange for partial course credit or payment. All were native English speakers. None of the participants in Experiment 2 took part in Experiment 1.

2.5.1.2. Stimuli
The same geometric shapes used in Experiment 1 were used in Experiment 2.

2.5.1.3. Procedure
Participants were randomly assigned to one of three conditions: 2-person group (25 groups, N = 50), 3-person group (25 groups, N = 75) or 5-person group (25 groups, N = 125). Participants were randomly assigned to the director or matcher role (where the matcher tries to identify each shape from its description). Each participant was seated at a separate computer terminal and all communication took place using an Internet text-based chat program (http://xchat.org/). The directors’ goal was to successfully communicate each target shape, in writing, to each of the members of their group. Their text appeared on the matcher/s screen after the director pressed the return key. The
matcher/s could freely interact with the director and each of the other matchers using the text chat program. All communication was available to all members of the group via a shared chat screen. The same set of 18 geometric shapes used in Experiment 1 was used in Experiment 2. In each condition participants completed the task four times, with the array of geometric shapes presented in a different random order on each game. Each trial ended when each matcher typed ‘Got it’ into the text-chat editor. Participant roles (director, matcher) were fixed throughout the experiment.

2.5.2. Results and Discussion

Number of words again provided a measure of communicative effort. Two sets of analyses were conducted. The first assessed the extent to which the directors’ first description for each shape was influenced by strategic individual-level audience size. The second assessed the extent to which the directors’ shape descriptions were influenced by multiparty communication dynamics (i.e., non-strategic interaction-level audience design).

The artificiality of Experiment 1 may have diminished our findings; directors may have been unwilling to engage in extensive audience design given the absence of their imagined audience. In Experiment 2 the audience was co-present and visible, with participants seated at computer terminals in the same testing room. Sending a message with the text chat tool required the director to press the return key. Thus, the first message produced by the director for each shape at Game 1 occurred in the absence of matcher feedback (i.e., it is non-interactive). With a co-present audience, did the directors produce longer messages for larger audiences? Again, the answer is no; message length was similar across the 2-person ($M = 13.79$ words, SD = 7.17), 3-Person ($M = 12.03$ words, SD = 6.06) and 5-Person groups ($M = 10.21$, SD = 7.70; one-way between-participant ANOVA, $p = .20$).

Did the co-present audience promote more strategic audience design relative to an absent audience? Comparing the first message produced by directors for each shape in Experiments 1 and 2 indicated that participants produced shorter messages when their audience was co-present (compared across equivalent 2-Person and 5-Person groups). This was confirmed by a 2x2 ANOVA treating Condition (Experiment 1 Non-interactive, Experiment 2 Interactive) and Group Size (2-person, 5-person) as between-participant factors. The ANOVA returned a main effect of Condition [$F(1,96) = 6.12$, $p < .05$, $\eta^2 = .06$],
indicating that participants produced shorter messages in the interactive context (compared to the non-interactive context). No other effects reached statistical significance ($p > .13$). In fact, the mean length of directors’ first message for each shape in the interactive context (Experiment 2) did not differ from the length of messages produced for oneself in the non-interactive context (Experiment 1; one-way between-participant ANOVA, $p = .24$).

In summary, group size did not affect strategic audience design in the interactive context. In fact, participants engaged in strategic audience design less in the interactive context (Experiment 2) when compared to the non-interactive context (Experiment 1). Compared to the non-interactive context, participants in the interactive context appear to minimize their communicative effort by offering a more succinct message at the outset that later be refashioned based upon addressee feedback if need be.

The next set of analyses examines the extent to which audience design results from non-strategic interaction-level processes. As group size increased so too did the mean total number of words produced by each director to describe each shape (Total mean number of words is the total number of words produced by the director to describe each of the geometric shapes divided by the total number of shapes. This calculation was conducted separately for each director and for each set of shape descriptions at Game 1 to Game 4). The same pattern was observed among matchers; the mean total number of words produced by each matcher increased as group size increased. Over games 1 to 4, the mean total number of words produced by directors and matchers decreased (see Figure 2.3.). These observations were confirmed by ANOVA.

The mean total number of words contributed by each director was entered into a mixed design ANOVA that treated Group Size (2-Person, 3-Person, 5-Person) as a between-participant factor and Game (1-4) as within. This returned a main effect of Group Size [$F(2,72) = 9.73, p < .01, \eta^2 = .21$] and Game [$F(3,216) = 335.30, p < .01, \eta^2 = .82$], in addition to a Group Size by Game interaction [$F(6,216) = 6.87, p < .01, \eta^2 = .16$]. The interaction is explained by the greater number of words produced by directors in the larger groups at game 1 [5-person = 3-Person, $t(48) = 1.58, p = .12$, > 2-Person, $t(48) > 2.57, p < .05$, $d > .74$], and the comparable number of words produced by directors in the different sized groups at game 4 ($p > .12$). A similar pattern is observed when the mean total matcher words are entered into the same ANOVA: a main effect of Group Size [$F(2,72) = 35.44, p < .01, \eta^2 = .50$] and Game [$F(3,216) = 178.30, p < .01, \eta^2 = .82$].
.71], in addition to a Group Size by Game interaction \([F(6,216) = 21.87, p < .01, \eta^2 = .38]\). Like directors, the interaction is explained by matchers producing more words in larger groups at game 1 [5-person > 3-Person > 2-Person, \(t(48) > 3.73, ps < .01, ds > 1.12\)], and a smaller difference at game 4 [\(ps > .06\), with exception that 5-person > 2-person; between-participant \(t(48) = 2.41, p < .05, d = .69\)].

Figure 2.3. Mean number of words produced by directors and matchers to communicate each abstract shape across Games 1-4 when in a 2-Person, 3-Person or 5-Person Group. Error bars indicate the standard errors of the means.

Consistent with a non-strategic account, these findings indicate that as group size is increased more effort is required (by directors and matchers) to coordinate the groups’ collective situation model. Contrary to a strategic account, the greater communication burden is placed on matchers rather than directors. Matchers’ relative contribution (total words contributed by matchers divided by total words contributed by directors and matchers) increased as group size increased from 2- to 3- to 5-Persons (16.45%, 24.17% and 33.18% at Game 1, and 6.52%, 8.91% and 14.82% at Game 4). The same pattern of results for director words and matcher words is returned when these percentage scores are entered into the same mixed design ANOVA. Again there is a main effect of Group Size \([F(2,72) = 19.92, p < .01, \eta^2 = .36]\) and Game \([F(3,216) = 114.86, p < .01, \eta^2 = .62]\), in addition to a Group Size by Game interaction \([F(6,216) = 3.54, p < .01, \eta^2 = .10]\). The interaction is explained by the greater percentage of words contributed by matchers in the larger groups at Game 1 [5-Person>3-Person>2-Person, between-
participants \( ts(48) > 3.02, ps < .05, ds > .85 \) and a smaller difference at Game 4 \( ps > .07 \) with exception that 5-Person > 2-Person; between-participant \( t(48) = 2.64, p < .05, d = .76 \).

Interaction-level processes had a strong effect on communicative effort; directors produced more words as a result of their interactions with matchers, and as more matchers were added (with potentially different perspectives) more social interaction was necessary to communicate the different shapes (driven primarily by the matchers). Evidence for this is reflected by a positive correlation between matcher words and director words at Game 1 \( r(75) = .59, p < .01 \), Game 2 \( r(75) = .49, p < .01 \) and Game 3 \( r(75) = .39, p < .01 \). With so few words produced by directors and matchers and Game 4, the correlation did not reach statistical significance \( r(75) = .14, p = .23 \).

Using an interactive communication task Experiment 2 showed that group size affects communicative effort. This arose on account of non-strategic interaction-level processes rather than strategic individual-level message design. In fact, directors behaved more egocentrically (initial messages) when the audience was co-present (compared to absent). Director and matcher behaviour (words contributed) was interdependent; as more matchers were added more social interaction was needed to establish a shared situation model.

2.6. Experiment 3

In Experiment 1 and 2 number of words produced was used as a proxy for audience design, where more words equated to more audience design. While number of words has often been used in this way, a problem with this measure is that it says nothing about the content of the message. It is quite possible that two descriptions that are comparable in length may differ in terms of message informativeness. For example, one description might repeat a description from the same perspective whereas the other might add an additional perspective on the same shape. Experiment 3 sought to validate and extend the results of Experiment 1 and 2 by examining naïve participants’ ability to pick out the intended shape from its description. This comprehension score complements the production scores used in Experiment 1 and 2.

Actively participating in a conversation yields superior comprehension compared to passively overhearing the same conversation (Schober & Clark, 1989). However, some types of non-participation are better than others. Fox Tree (1999) compared overhearer’s comprehension when listening in on a two-party
dialogue or a single-party monologue (where speakers described a range of abstract geometric shapes from an array). Comprehension was higher when overhearing a two-party dialogue. A follow-up study indicated that this comprehension benefit arose on account of being exposed to multiple perspectives in the dialogue condition, but only a single-perspective description in the monologue condition (Fox Tree & Mayer, 2008).

Experiment 3 extends these studies to determine if non-active participants will show a comprehension benefit as the number of perspectives is increased from one to many (as is likely to be the case in the context of multiparty communication). The written descriptions produced by participants in Experiment 1 and 2 were given to naïve participants who tried to pick out the target shape from its description. Our first prediction is that Experiment 1 descriptions that are designed for another person/s will be more accurately identified than those designed for oneself (as per Fussell & Krauss, 1989a). This would suggest that the strategic message adjustments made by directors (indicated by an increase in message length) were successful. Given their comparable message length, no difference in identification rates is expected between the messages designed for different sized audiences in Experiment 1. Experiment 2 descriptions will return higher comprehension scores when compared to the Experiment 1 descriptions. This prediction is made on account of the longer descriptions in Experiment 2 and the greater number of perspectives they are likely to contain. Our final prediction is that descriptions produced in the larger interactive groups in Experiment 2 will be associated with improved comprehension. This prediction is again made on account of the longer descriptions and greater number of perspectives they are likely to contain.

2.6.1. Method

2.6.1.2. Participants
One hundred and seventy-five undergraduate students from the University of Western Australia participated in exchange for partial course credit or payment. All were native English speakers. None of the participants in Experiment 3 took part in Experiment 1 or 2.

2.6.1.3. Stimuli
The geometric shapes and descriptions produced by participants in Experiment 1 and 2.
2.6.1.4. Procedure

Participants were randomly assigned to one of 7 conditions: Self, 2-person, 5-person or 10-Person descriptions (Experiment 1), 2-Person, 3-Person or 5-Person descriptions (Experiment 2). Twenty-five participants were assigned to each condition. Experiment 3 participants were given an A4 sheet of paper containing each of the 18 shapes (presented in a different random order for each participant). They were also given the shape descriptions from the relevant condition (single speaker description from Experiment 1 or interactive transcript from Experiment 2) and asked to match the shape to the description (by inserting the shape number next to the description). Shape descriptions were given in the same order participants in Experiment 1 and 2 produced them. Only shape descriptions at Game 1 were used.

2.6.2. Results and Discussion

We first examined participants’ ability to pick out the target shapes from the descriptions given by directors in Experiment 1 (non-interactive). Comprehension of messages produced for different sized groups (2-Person, 5-Person and 10-Person) in Experiment 1 were understood equally well (one-way between-participants ANOVA, \( p = .73 \)). Messages designed for another person (collapsed across 2-Person, 5-Person and 10-Person conditions) were better identified than messages designed for oneself (\( t(98) = 2.08, p < .05, d = .49 \)). Next we examined participants’ ability to pick out the intended shapes from the interactive communication between directors and matchers in Experiment 2. Like Experiment 1, group size (2-Person, 3-Person, 5-Person) did not affect comprehension (one-way between-participants ANOVA, \( p = .36 \)). Thus, the greater amount of words used in the larger interactive discussions did not translate into better comprehension by naive participants (see Figure 2.4).

The final analysis compares the comprehension of naïve participants across the non-interactive and interactive experiments. We compared the 2 and 5-Person groups from Experiment 1 (non-interactive) with the 2 and 5-Person groups from Experiment 2 (interactive). Comprehension scores were entered into a between-participant ANOVA with Group Size (2-Person, 5-Person) and Condition (Non-interactive, Interactive) as factors. This returned a main effect of Condition \( [F(1,96) = 9.80, p < .05, \eta^2 = .09] \), but no effect of Group Size or Group Size by Condition interaction (\( ps > .45 \)). The main effect of Condition indicates that the interactive group discussions facilitated better comprehension among non-active participants (compared to non-interactive monologues).
Figure 2.4. Naïve participants’ comprehension (% correctly identified) of descriptions produced under the different conditions of Experiment 1 and Experiment 2. Error bars indicate the standard errors of the means.

2.7. General Discussion

We contrast two explanations of audience design during multiparty communication: audience design as a strategic individual-level message adjustment, and audience design as a non-strategic interaction-level adjustment. Naïve overhearers’ better understanding of what was agreed in larger group discussions led Fay et al (2000) to conclude that members of larger groups engaged in more extensive strategic individual-level audience design to ensure the greater variety of perspectives contained in the larger group were catered to. However, Fay et al noted that the communication dynamics in the small and large groups were very different; small group discussions were more interactive than large group discussions. Thus, the observed comprehension benefits may have resulted from the different communication dynamics typical of small and large group discussions. This alternative explanation is consistent with audience design as a non-strategic interaction-level adjustment.

The behavioural studies reported try to tease apart the effects of strategic and non-strategic message design by examining audience design in a non-interactive and interactive multiparty communication task (Experiment 1 and 2 respectively). Controlling for interaction-level processes, Experiment 1 showed that messages designed for another person were longer (number of words) than those designed for oneself, a finding consistent with strategic message design. However, audience size did not affect message length (messages designed for One, Four or Nine others were similar in length), indicating that audience size does not affect strategic message design. Allowing for interaction-level processes,
Experiment 2 showed that as group size increased so too did the number of words exchanged by the members of the group. However, this did not occur on account of strategic message design processes; directors’ initial messages (prior to addressee feedback) in Experiment 2 (interactive) were shorter than those produced by directors in Experiment 1 (non-interactive) for the same sized audiences. With a co-present audience, directors seemed content to initially offer limited information, the meaning of which could later be interactively negotiated if necessary. The increase in communicative effort (number of words exchanged between group members) as group size increased in Experiment 2 suggests an important role for non-strategic interaction-level processes; as more addressees were added more social interaction was needed to negotiate a description of each shape that was acceptable to each group member.

Using an overhearer-type paradigm Experiment 3 extended the findings of Experiments 1 and 2. Longer messages that were designed for another person (as opposed to oneself; Experiment 1) were more informative; their intended audience understood them better (replicating Fussell & Krauss, 1989a). Thus, participants’ strategic individual-level message adjustments were rewarded by improved matcher comprehension. Furthermore, shape descriptions that were interactively negotiated (Experiment 2) contained more words than individually designed messages (Experiment 1) and were more accurately decoded by non-active participants. This finding supports a role for non-strategic message design, and replicates those showing the comprehension benefits of listening in on dialogues compared to monologues (Branigan, Catchpole, & Pickering, 2011; Fox Tree, 1999; Fox Tree & Mayer, 2008). Contrary to expectations, the greater number of words exchanged in the larger interactive groups did not translate into improved comprehension by non-active participants in Experiment 3. One explanation is that number of words is not an accurate guide to the number of perspectives exchanged (Fox Tree & Mayer, 2008). The increased number of words exchanged in the larger interactive groups may reflect greater perspective elaboration rather than the addition of unique perspectives. Another explanation is that it is the grounding process that benefits comprehension (rather than the number of unique perspectives; Branigan, Catchpole, et al., 2011). If correct, this would explain the broad difference in comprehension rates between the interactive and non-interactive contexts.

Taken together, the studies reported here indicate an important role for non-strategic processes to message design during group communication. While
our study indicated a role for strategic individual-level audience design, this was only in so far as people distinguished between their own informational needs and the needs of someone else, and did not extend to different sized audiences (contrary to Fay et al., 2000). Consistent with a non-strategic interaction-level account, our participants did not consider audience size during initial message planning, but instead adjusted their messages on the fly, in response to feedback they received from their audience. These behavioural findings complement a recent online study (using reaction times to measure speech planning) that shows that message design is primarily a result of other-prompted rather than self-prompted speech adaptation (Gann & Barr, 2012). Like this study, our findings indicate that audience design during multiparty communication is an adaptation achieved through monitoring and adjustment during social interaction rather than being pre-planned at the individual-level.
3. Investigating the impact of audience size and majority influence upon audience design

3.1. Introduction

In a non-interactive referential communication task, group size did not influence audience design (Chapter 2, Experiment 1). Participants did not differ in the mean number of words used in their descriptions of abstract shapes when instructed to write for an audience that contained one, five, or ten individuals. However, participants wrote fewer words in descriptions intended for personal use only. These findings suggest that participants put more effort into writing for an audience (compared to self), however the size of the audience did not influence the amount of effort. Comprehension results mirrored these findings; participants that matched descriptions to shapes were more accurate with descriptions that were intended for others (regardless of group size), compared to descriptions intended only for personal use.

In Experiment 1 (Chapter 2) it was hypothesized that participants would put in more effort when writing descriptions for a larger audience because of an appreciation that a larger audience is more likely to contain a wider variety of perspectives, however results did not support this hypothesis. A limitation of Experiment 1 (Chapter 2) was that the perspectives present in the audience were not made explicit to participants and this may explain why participants did not expend more communicative effort for the larger audience size. Participants may not have possessed enough information about the audience to enable them to easily adapt their communication. Hypothetically, the more information available about the intended audience, the greater the opportunity a speaker/writer has for perspective taking and audience design (Krauss & Fussell, 1996). Studies investigating communication between experts and laypersons have demonstrated that experts are better able to adapt their communication for the audience when provided with additional information about that particular audience (Nuckles, Winter, Wittwer, Herbert, & Hubner, 2006; Nuckles et al., 2005; Wittwer et al., 2010). For example, Nuckles et al., (2005) administered an assessment tool that gauged the knowledge level of novices. The results of this assessment tool were
then given to experts, and the subsequent instructions the experts produced were more specifically tailored to the audience knowledge compared to experts who were not provided with any audience information. The present study examines communication for an audience when the perspectives present in the audience are made explicit to the message producer. The aim of the present study is to extend the experiments reported in the Chapter 2 by re-examining the influence of a group audience upon audience design when the perspectives of the audience is made explicit to the message producer.

The most widely used paradigm for studying audience design is the *referential communication task*. This was the method used in the Chapter 2 experiments, and again in the present study. Most referential communication studies have investigated how information gained via conversational interaction can be used to design utterances (H. H. Clark & Wilkes-Gibbs, 1986; Fay, Garrod, et al., 2010; Galantucci, 2005; Krauss & Fussell, 1996; Krauss & Weinheimer, 1966). The to-be-described stimuli in these studies are typically of an abstract nature and participants have no prior established perspective on what they are communicating. This has been a deliberate action on the part of the investigators to engineer a communicative context that encourages the emergence of a shared perspective over time via a process of interactive negotiation. Other studies suggest that once a shared perspective has been established with a particular individual over repeated reference, the *linguistic convention* becomes specifically associated and re-used with that person (Brennan & Clark, 1996; Brennan et al., 2013; Galati & Brennan, 2010; Gann & Barr, 2012; Gorman et al., 2013; Horton & Gerrig, 2002; Wilkes-Gibbs & Clark, 1992; Yoon & Brown-Schmidt, 2014). Strategic accounts of communication such as the *collaborative model* argue that audience design is a critical component during the process of conventionalisation (e.g., Brennan & Clark, 1996). Other non-strategic accounts such as the *interactive alignment model* have argued that audience design is not necessary and that linguistic conventions can emerge via unconscious priming (e.g., Pickering & Garrod, 2004). The present study will contribute to the debate by examining the extent of audience design when the perspective of the audience is known prior to any kind of interaction, and additionally when perspectives between the participant and audience are conceptually different (misaligned). In naturalistic conversational contexts people bring a wealth of preconceived values and attitudes developed from prior experience to the interaction, and will therefore encounter topics where both parties have a different perspective upon what is
being discussed. The present study therefore seeks to investigate audience design behaviour in the context of misaligned perspectives that has received little attention in the research literature.

The present study explores how participants design their communication for an audience in a referential communication task when the perspective of the audience is made explicit. Most prior referential communication studies that have examined misaligned perspectives are limited to tasks that require communication about spatial location (Schober, 1993, 1995, 2009), or objects that exist in mismatched spatial arrays (for a review see: Brown-Schmidt & Hanna, 2011). These studies suggest that participants are sensitive to the audience perspective and design messages accordingly. For example, in a study by reported by Schober (1993) in the vast majority of trials participants described from the audience’s perspective (e.g., “It’s the one on your right) instead of their own perspective (e.g., It’s the one on my left). However, recent research has also demonstrated that when there is a higher degree of spatial misalignment more director-centred (egocentric) instructions are provided (Galati & Avraamides, 2013b).

Instead of misaligned spatial perspectives, the present study investigates misaligned conceptual perspectives. One study that examined misaligned perspectives in a referential communication task requiring communication of conceptual perspectives was reported in a doctoral thesis by Lockridge Jr. (2007). Lockridge Jr. (2007) pre-determined participant perspectives for abstract shapes by conducting a training phase prior to the main communication task. For some shapes, the perspective of the director and matcher was experimentally manipulated to be misaligned, and the director was made aware this could occur. However, the director did not know precisely what the perspective of the matcher was until the matcher provided feedback to inform them during the task. This contrasts with the previously mentioned spatial studies where perspective misalignment is clear before the director begins producing their description. Lockridge Jr. (2007) reported that directors typically began a trial by offering the matcher an elaborated form of their own personal perspective. This was usually accepted by the matcher and formed the basis of a later referring convention. However, on the few occasions where the matcher did offer their contrasting perspective directors tended to shift to this perspective.

Other research examining when perspectives are conceptually misaligned are studies investigating expert-layperson communication (Nuckles & Bromme,
The expert-layperson research has found that experts are sensitive to discrepancies in knowledge and typically attempt to design appropriate simplified communication for laypersons. However, these studies have also found that experts are biased by their own salient perspective, and this can reduce audience design (Bromme, Jucks, & Runde, 2005; Hinds, 1999). This research is consistent with arguments made by others that the salience of one’s own perspective can act as a barrier to consideration of another person’s perspective even when the perspective of the other person is clear (Epley & Caruso, 2008; Keysar, 2007). Therefore in the present study it is expected that the salience of one’s own perspective will cause participants to frequently favour their own perspective over the audience perspective. Due to the lack of prior similar experiments the precise extent of this egocentric behaviour cannot be predicted. This aspect of the study is exploratory.

The main aim of the present study is to extend upon the Chapter 2 study by determining if the presence of multiple perspectives in the audience promotes audience design when the perspectives contained in the audience are explicit. In Chapter 2, when the audience perspectives were unknown, no difference was found between message lengths for a single audience compared with audiences of varying other sizes. In the present study, multiple perspectives contained in the group audience are made clear to participants. It is hypothesized that when participants are made aware of the precise nature of the perspectives within a group audience, they will be more inclined to design their communication for that audience.

Another aim of the present study is to examine if the presence of a dominant perspective within a group results in more audience design compared with an audience containing no clear majority perspective. An important finding in social psychology is that the presence of a majority perspective can influence judgements to be consistent with the majority perspective (Asch, 1956; Bond & Smith, 1996; Cialdini & Goldstein, 2004; Cialdini & Trost, 1998; Levine, 1999; Sherif, 1936). An example of how a majority audience perspective can influence communication has been demonstrated by studies investigating the communication of stereotypes (A. E. Clark & Kashima, 2007; Kashima, 2014; Ruscher, 1998). A. E. Clark and Kashima (2007) showed that participants are more likely to include stereotypic information in stories for other people when they believe that 85% of other people endorsed the stereotypes compared to 25% endorsement. This finding suggests that the perceived level of endorsement of a
particular perspective within the audience will influence audience design. Therefore, in the present study, it was predicted that participants writing descriptions for a small group audience that contained a majority perspective will shift to the dominant audience perspective in their descriptions.

### 3.3. Method

#### 3.3.1. Participants

One hundred and sixty undergraduate psychology students (109 females) from the University of Western Australia, $M = 20.71$ years, $SD = 5.05$ took part in exchange for either partial course credit or payment.

#### 3.3.2. Materials

Eighteen abstract shapes called tangrams were used as stimuli, see Figure 3.1. These were the same stimuli used in the experiments reported in Chapter 2, and the full list of tangrams is provided in the appendix section of this thesis.

![Tangram Shapes](image)

*Figure 3.1. Examples of the tangram shapes used as stimuli. The full list of tangrams is provided in the appendix section at the end of this thesis.*

#### 3.3.3. Procedure

In the first phase of the experiment participants were given a printed A4 sheet that contained an array 18 abstract shapes (called tangrams). The tangrams were each labelled with a letter, A through to R. Participants then opened a Microsoft Word document that on the first page provided a space to type their age and gender. Underneath appeared the following instructions:

**Instructions** please read carefully

Next to the letters below please write descriptions for the pictures on the provided sheet labelled A-R. Imagine that you will receive a jumbled up version of the pictures at a later date and that you will need to match up your descriptions to the pictures. Write as little or as much as you want.

Below the instructions the letters A – R were listed on separate lines for participants to write their own personal descriptions for each tangram. These
personal descriptions were obtained for two reasons. First, so participants could establish their own perspective on the stimuli. Second, so that each personal description could be compared to the description produced for the audience. This allowed an examination of precisely how participants subsequently modified their descriptions that were intended for an audience. Once completed, participants were randomly allocated to one of four conditions – unknown audience, single audience, majority absent, and majority present conditions. In all four conditions participants were instructed to write a second set of descriptions such that the audience could accurately match each description to the appropriate tangram. In the unknown audience condition, participants were instructed to write descriptions that a random other person would understand. The instructions were:

**Further Instructions please read carefully**

Now... you are required to write descriptions for each of the pictures in the remainder of this document below for another person to receive your descriptions at a later date. The person whom you are writing for has completed the task that you just did on the previous page (writing descriptions for themselves) at an earlier time.

On the pages below you are to proceed through the shapes one by one. First copy and paste the description you wrote for yourself (in the previous task) at the spot marked with the bold letter*. Then you are to write a description for the shape that will be presented to your audience at a later date. This audience will be required to match your description to the appropriate shape contained in a jumbled array like the one on the first page of this document. The same shapes will be presented, but in a jumbled order. Note that the space between each shape to be described is not supposed to be an indication of how much you should write, and you can write as much or as little as you choose. Do not worry if you end up going on to a new page and things get shifted around. Simply work with the goal to make the descriptions for the audience as understandable as possible whilst also making the most efficient use of words.

*Note: Participants were required to copy and paste their personal description into the space above where they wrote a description for the audience so that in conditions where the audience description was also provided, both the participant’s own personal and audience description/s would be present. This was done so that the subsequent description of the audience would not be determined by any problems remembering the participant might have remembering their own or audience descriptions. In essence, this was done in order to control for individual differences in memory that may have acted to confound results.

In the remaining three conditions participants were provided with tangram descriptions produced by their target audience. The instructions were the same as shown above except with minor wording changes to make clear to the participant that they were writing for a specific single audience member, or a
specific group audience. Each audience description consisted of an overall core perspective (e.g., the shape looks like a duck) with three additional pieces of information. For example, the description used in the single audience condition for the leftmost tangram in Figure 3.1 was:

| Audience description – Looks like a duck, trying to take off, with wings flapping behind it, and it has little triangle feet. |

In the majority absent condition, participants were provided with three descriptions that each contained a different perspective. For example, the descriptions used in the majority absent condition for the leftmost tangram in Figure 3.1 were:

| Person 1 – Looks like a duck, trying to take off, with wings flapping behind it, and it has little triangle feet. |
| Person 2 – A child, in a dress, running along, their arms out towards mother. |
| Person 3 – Fieldsman, with body bent, trying to take a high catch, with head bent back looking at the ball. |

In the majority present condition, participants were provided with five descriptions where three of the five contained the same perspective. For example, the descriptions used in the majority present condition for the leftmost tangram in Figure 3.1 were:

| Person 1 – Duck, with little triangle feet, has wings flapping behind it, trying to take off. |
| Person 2 – Duck, with its wings flapping behind, trying to take off, and it has little triangle feet. |
| Person 3 – A child, in a dress, running along, their arms out towards mother. |
| Person 4 – Fieldsman, with body bent, trying to take a high catch, with head bent back looking at the ball. |
| Person 5 – Looks like a duck, trying to take off, with wings flapping behind it, and it has little triangle feet. |

In the example provided person 1, 2 and 5 describe the shape as a “duck”, with the same additional pieces of information re-arranged. The other two audience members describe the shape as a “child” (person 3) and a “fieldsman” (person 4). Therefore “duck” is the majority perspective in this example. In the majority absent condition two of the audience members who described the shape as a “duck” were excluded (person 1 & 2). In the majority absent condition the “duck” perspective is only one of three different perspectives (“duck”, “child” & “fieldsman”). Although the size of the audience differs between the majority present (five members) and majority absent conditions (three members), this was necessary to keep the content and number of perspectives present in the two conditions the same. The key difference between these two conditions is that in
the majority present condition one perspectives is the *most commonly held perspective* (3 out of 5 members have the perspective).

### 3.3.4. Coding of descriptions

A content analysis was performed by comparing across descriptions that were produced by the participant for *personal* use, compared to those produced *for their audience*. This meant the experimenter read through and contrasted all 2880 descriptions produced across all participants. This was done to reveal in greater detail how the participant had changed (or not changed) their perspective when writing a description for their audience. Additionally this enabled an assessment of whether or not the participant used the perspective of the audience in their subsequent description. For simplicity, the examples given in the following paragraphs are from the single audience condition.

If a participant continued to use their own perspective without any substantial modification (evident from their personal description) when writing for the audience, the trial was coded as *perspective retention*. A participant whose personal description for the left-most tangram in Figure 3.1 was “Running right looking at sky”, was provided with the audience description “Looks like a duck, trying to take off, with wings flapping behind it, and it has little triangle feet”. This participant later wrote the following description for their audience: “Running right and looking at the sky”. This participant retained their own way of describing the shape instead of adopting the provided audience *duck* perspective. This trial was therefore coded as *perspective retention*.

If a participant continued to use their own perspective when writing for the audience, but also modified that perspective by adding or omitting details, the trial was coded as *perspective modification*. For example a participant whose personal description for the left-most tangram in Figure 3.1 was “Square head, running with arms outstretched” was provided with the audience description “Looks like a duck, trying to take off, with wings flapping behind it, and it has little triangle feet”. This participant later wrote the following description for their audience – “Woman with square head running with arms outstretched towards left of page”. This participant modified their original *person running and reaching* perspective by adding some extra detail instead of adopting their audience’s *duck* perspective. This trial was therefore coded as *perspective modification*.

If a participant abandoned their personal perspective in favour of a new perspective of their own devising when writing for the audience, the trial was
coded as perspective reconceptualization. For example a participant whose personal description for the tangram second from the left in Figure 3.1 was “Candle guy from Beauty and the Beast” was provided with the audience description “Looks like a soccer goalkeeper, diving to make a save, he has a diamond head, and you can’t see his feet”. This participant subsequently wrote a description for the audience – “Looks like the letter Y with a diamond in the middle of the fork”. Note how the participant devised a new perspective (Letter Y) that is dissimilar to both their personal perspective (candle guy) and the provided audience perspective (soccer goalkeeper). This trial was therefore coded as perspective reconceptualisation.

If a participant combined their personal perspective with the perspective of the audience, the trial was coded as perspective combination. An example was a participant whose personal description for the right-most tangram in Figure 3.1 was “Man facing the front with right leg out and left arm out”, provided with an audience description “Looks like a starfish, with legs all radiating out from the body, and the upper right arm has been chopped off so it only has four legs”. This participant subsequently wrote a description for the audience – “Man standing on left leg, with right leg out like a starfish. Also only has left arm (right arm has been chopped off)”. This participant’s description for the audience combines their own perspective with the provided audience perspective. This trial was therefore coded as perspective combination.

If a participant abandoned their personal perspective in favour of the perspective provided by the audience, this was coded as perspective shifting. For example, a participant whose personal description for the tangram second from the right in Figure 3.1 was “Skipper”, was provided with an audience description “Looks like Peter Pan, with his arm stretched out in front, and his legs tucked up underneath him, as if he is flying along”. This participant subsequently wrote a description for the audience – “Peter Pan”. This participant abandoned their personal perspective in favour of the audience perspective. This trial was therefore coded as perspective shifting.

When the participant’s personal perspective happened to be the same as the provided audience perspective (e.g., both perceive the shape to look like a “duck”) it is unclear if the participant is modifying their own perspective or shifting to the audience perspective. As discussed in the introduction, the trials of interest are where a mismatch exists between the perspective of the participant and the audience. Therefore trials where the participant’s personal perspective
matched a perspective in the audience were excluded from the content analysis. Uncommon descriptions were designed by the experimenter for use as audience descriptions in the current experiment to reduce the likelihood of participants’ personal descriptions matching the audience descriptions. Mismatched perspectives comprised 91.4%, 74.2%, and 78.1% of the trials for the single audience, majority absent and majority present conditions respectively. Thus, the selection of uncommon audience descriptions (from those used in Chapter 2) was mostly successful. To assess the reliability of coding, a naïve judge rated comparisons for three participants randomly chosen from each experimental condition (216 trials in total). Percentage agreement between the experimenter and the naïve judge of 76% was obtained, with associated Cohen’s Kappa of .68. Cohen’s Kappa of .68 is acceptable agreement based on Landis & Koch (1977) guidelines.

3.4. Results

In previous experiments (Chapter 2) number of words has been used to measure participants’ communicative effort. Number of words is commonly used to measure audience design (For example: Bromme et al., 2001; H. H. Clark & Wilkes-Gibbs, 1986; Fussell & Krauss, 1989a, 1989b; Galati & Brennan, 2010; Hupet & Chantraine, 1992; Wilkes-Gibbs & Clark, 1992). Therefore, number of words is also reported here. This kind of generic measure of communication effort is then contrasted with the more specific measure of audience design afforded by the content analysis.

3.4.1. Number of words

This measure of communicative effort was examined to answer several questions of interest. First, would participants put more communicative effort into descriptions intended for an audience compared with descriptions solely intended for personal use? As expected results were found to be consistent with Chapter 2 findings. As can be seen in Figure 3.2, in all conditions more communicative effort was put into descriptions intended for the audience compared to descriptions intended for personal use [all paired ts(39) > 2.01, ps < .05, ds > .39].

Was communicative effort for descriptions intended for the audience significantly different across conditions where the audience perspective was unknown versus known to the participant? Participants writing for an unknown
audience \((M = 22.40\text{ words, } SD = 16.58)\) wrote significantly more words compared with participants who wrote for a known audience \((M = 16.87\text{ words, } SD = 9.05)\) \([\text{independent } t(158) = 2.66, p < .05, d = 0.43]\). This finding indicates that without knowledge of the audience perspective more communicative effort was expended (in terms of words used). In the unknown condition participants had no knowledge of the audience perspective so were unable to tailor specific descriptions, and may have been producing more detailed descriptions to compensate.

Did communicative effort vary across conditions where the audience perspective was made explicit to the participant? Analysis revealed this was not the case, as there was no overall significant difference across the three conditions where the audience perspective was made explicit \([\text{One-way independent ANOVA, } F(2,117) = 2.42, p = .09]\). Therefore the number of words analysis suggests that in conditions where the audience perspective was explicit, participants put in similar communicative effort into writing descriptions. The limitation of this analysis is that it is unable to reveal to what extent the participants adopted the perspective of the audience in their descriptions. The content analysis given in the next section directly addresses this question.

![Figure 3.2. The mean number of words used for descriptions intended for personal use and for the audience across each experimental condition. Error bars represent standard errors of the means.](image)

### 3.4.2. Content analysis

To provide a more detailed understanding of participants’ communication behaviour a content analysis of tangram descriptions was performed. Participants’ descriptions were categorised as retention, modification, reconceptualization, combination, or shifting. The mean percentage of trials that participants engaged in each type of message design in each condition is presented in Figure 3.3. For
the unknown audience condition modification was the most common response ($M = 71\%$), followed by reconceptualisation ($M = 18\%$), and retention ($M = 11\%$). Therefore, when participants wrote descriptions for an unknown audience they typically produced a more detailed version of their own perspective. How does this compare against participants that were given the audience’s perspective?

For the single audience condition shifting was the most common response ($M = 43\%$), followed by modification ($M = 36\%$), combination ($M = 11\%$), reconceptualisation ($M = 9\%$), and retention ($M = 2\%$). Retention and modification are trials where the participant has continued to use their personal perspective, and can both be considered forms of egocentric behaviour. Shifting and combination are trials where the participant has adopted the perspective of the audience, and are both forms of considerate behaviour (i.e., audience design).

Thus, the availability of the audience perspective enabled participants to tailor their descriptions specifically to the audience, resulting in less egocentric forms of description (retention/modification = 38\%) compared to the unknown audience condition (retention/modification = 82\%)\(^2\). While participants provided with the audience perspective were inclined to shift to the audience perspective, this occurred less than expected (overall average shifting/combination = 54\% of trials).

Did making the perspectives present in the group explicit facilitate audience design? For the majority absent condition, modification was the most common response ($M = 37\%$), followed by shifting ($M = 32\%$), reconceptualisation ($M = 18\%$), combination ($M = 10\%$), and retention ($M = 3\%$). There was no significant difference between the majority absent condition compared to the single audience condition when examining the difference in retention/modification [$Mann Whitney U = 761.5, z = .37, p = .71$]. Neither was there a significant difference when comparing these conditions on shifting [$Mann Whitney U = 702.5, z = .94, p = .35$]. These results suggest that participants did not behave differently when writing descriptions for a single person or for multiple audience members, all of whom express different perspectives on the described shapes.

Thus far, results indicate that the presence of multiple audience members (all with dissimilar perspectives) does not promote audience design. By contrast, when a group audience contains a majority perspective this does promote

\(^2\) It was not appropriate to compare across conditions here with a statistical test of significance as the number of audience design options available to participants in the two conditions is unequal.
audience design. For the majority present condition, perspective shifting ($M = 64\%$) was the most common response, followed by modification ($M = 20\%$), reconceptualisation ($M = 7\%$), combination ($M = 7\%$), and retention ($M = 2\%$). The presence of a majority perspective resulted in significantly less retention/modification compared to the single audience and majority absent conditions [both Mann Whitney Us $< 593.5$, $zs > 2.02$, $ps < .05$]. Furthermore, the presence of a majority perspective resulted in significantly more shifting compared to the single audience and majority absent conditions [both Mann Whitney Us $< 546.5$, $zs > 2.46$, $ps < .05$]. A closer look at the data indicates that when participants abandoned their own perspective, and shifted to the audience perspective in the majority absent condition, 51% of trials were shifting by combining multiple available audience perspectives. Across all trials of shifting in the majority present condition, 71% were shifting solely to the majority perspective, 13% were shifting solely to one of the minority perspectives, and 16% were shifting by combining multiple available audience perspectives. Therefore, when the audience contains multiple dissimilar perspectives, participants tend to combine multiple perspectives in their descriptions. In contrast, when a majority perspective is present, participants tend to shift to that perspective only (rather than combining multiple perspectives). Compared with conditions requiring communication to a single or varied group audience, audience design is promoted when participants write descriptions for a group audience containing a majority perspective that is explicit to the message producer.

![Mean percentage of trials participants engaged in each type of audience design in each condition.](image)

*Figure 3.3.* The mean percentage of trials participants engaged in each type of audience design in each condition. Note that for the conditions where participants were provided with the audience perspective/s (single, majority absent, and majority present) the trials examined were those where the participant’s personal perspective was misaligned with the perspectives of the audience.
3.5. Discussion

The studies reported in Chapter 2 found no evidence to support the hypothesis that communicating to a larger audience increases audience design. The aim of the present study was to re-examine this whilst making the presence of multiple perspectives in the group audience clear to participants. In the present study, participants used more words in their descriptions for the audience compared to their personal descriptions. This replicates the Chapter 2 findings (Experiment 1), and other previous studies (Fussell & Krauss, 1989a, 1989b). It was also found that participant descriptions for the audience were typically longer when writing for an audience with an unknown perspective compared to participants writing for an audience with a known perspective. At first glance this suggests less communicative effort occurring in the known-audience conditions. However the subsequent content analysis revealed that this conclusion is misleading; participants in the known-audience conditions used less words because they were able to cater specifically to the audience perspective. Thus, the mean number of words measure has limited value as a measure of audience design in the present study.

Prior studies, including those described in Chapter 2, have relied on the mean number of words as a measure of audience design (Bromme et al., 2001; H. H. Clark & Wilkes-Gibbs, 1986; Fussell & Krauss, 1989a, 1989b; Galati & Brennan, 2010; Hupet & Chantraine, 1992; Wilkes-Gibbs & Clark, 1992). This measure is better conceptualised as an indication of communicative effort (Horton & Gerrig, 2002). In some instances this may serve as a good indicator of adaptation to the perspective or needs of an audience, for example being sensitive to the audience having less knowledge (Bromme et al., 2001), or sharing certain knowledge (H. H. Clark & Wilkes-Gibbs, 1986). However, the content analysis conducted in the present study provides a more comprehensive picture of audience design behaviour (For another example of content analysis see: Horton & Gerrig, 2002). Researchers should be sensitive to the possibilities and limitations that different procedures and measures afford when investigating communication behaviour.

In the unknown audience condition the content analysis revealed that participants’ dominant communicative strategy was to provide a more detailed version of their own perspective (perspective modification). Without any knowledge of the audience this is a reasonable strategy to maximise communicative effectiveness. Participants required to write descriptions for a
single audience member with an explicitly provided perspective, frequently used the audience’s perspective ($M = 36\%$ of trials), however this occurred less often than retaining or modifying one’s own personal perspective ($M = 45\%$ of trials), i.e., they behave egocentrically. These results suggest that in a communicative context that involves explicitly misaligned perspectives, people can and do shift to the audience perspective, consistent with strategic models of communication (H. H. Clark, 1996; Krauss & Fussell, 1996).

However, the results are also somewhat consistent with egocentric accounts of interpersonal communication (Barr & Keysar, 2004; Epley & Caruso, 2008; Garrod & Pickering, 2004; Keysar, 2007). It is commonly argued that audience design is a fundamental and frequently occurring aspect of human communication (Bezuidenhout, 2013; Brown-Schmidt & Hanna, 2011; H. H. Clark, 1996). In the present study, by explicitly providing participants with the perspective of the audience, and by not imposing any time limit on responses, a communicative situation was created where participants were afforded every possibility to use the perspective of the audience in their communication.

However, using the perspective of the audience was not the dominant response; participants frequently elected to use their own perspective instead. This finding, whilst in no way denying the existence of audience design, questions how commonly audience design occurs during communication. More studies such as the current one are needed where the perspective taking behaviour of participants is measured in a clear and obvious way rather than relying on measures that can only be used to indirectly measure audience design, such as the number of words used. Given the counter-intuitive nature of these findings replication is warranted and is carried out in chapter 4.

Compared to communication for a single known audience member, participants communicating to a group audience containing three distinct perspectives might have been more inclined to adopt one or more audience perspectives in their descriptions for that audience (Fay et al., 2000). This expectation is based on the premise that an audience containing three distinct perspectives would challenge the participant to further consider perspectives different to their own, resulting in a greater willingness to engage in perspective shifting. This expectation was not met; there was no significant difference in the pattern of communication between participants required to communicate for a single audience member, or a group of three distinct audience members. This finding is consistent with the Chapter 2 (Experiment 1) finding that
communicating to more audience members does not facilitate greater audience design compared to an audience of one. The present study adds to the results of Chapter 2 by demonstrating that this applies even when the perspective of the group audience members is explicit. Perhaps when faced with an audience containing divergent perspectives the participant finds it difficult to choose amongst them and so maintains their own perspective. Or, when faced with multiple interpretations (with no clear consensus), providing one’s own interpretation is considered a reasonable option.

A different pattern is observed when participants communicated to a group audience that contained a dominant perspective. Under these circumstances participants were more likely to adopt that dominant perspective in their communication compared to when there was no dominant group perspective present. This is consistent with studies of stereotype communication reporting that higher perceived endorsement of stereotypes increases the inclusion of stereotype consistent information when telling stories (A. E. Clark & Kashima, 2007; Lyons & Kashima, 2003). This is also consistent with research showing that people in discussion groups tend to gravitate towards and become stuck upon a dominant perspective, i.e., groupthink (Esser, 1998; Janis, 1972; Park, 1990). The present study is the first to demonstrate majority influence in a referential communication task by including a condition with an audience containing a clear majority perspective. This is argued to constitute a facilitation of audience design behaviour on the part of the message producer. That is, the message producer recognised a majority perspective within the audience, and designed their message to maximise the clarity for that particular audience.

However, an alternative explanation could be that the message producer may instead be adopting the majority perspective as their own new personal perspective, and thereby what looks like facilitated audience design may perhaps instead be due to a more basic shift in the message producer’s own perspective. Future research is therefore required to tease apart the precise cognitive processes that are driving the effect observed in the present study.

Although the presence of a dominant perspective promoted perspective shifting, there remained a considerable proportion of trials where participants ignored the dominant audience perspective. In the majority present condition the total egocentric (retention and modification) responses were returned on 22% of trials across participants. In the other conditions where the audience perspective/s were made explicit, egocentric communicative behaviour was even
higher. The average retention/modification trials was 40% in the majority absent condition, and 38% in the single other audience condition. If participants were able to freely interact with their audience, providing their own perspective might work as a viable strategy because the audience could seek clarification to correct any misunderstanding (Pickering & Garrod, 2004). However, the communication task used in the present study was non-interactive, and the most effective strategy was to write descriptions using the audience perspective. As discussed, rather than do this participants often provided the audience with a modified version of their own personal perspective. After the experiment each participant was verbally queried about how they completed the task and to provide a brief rationale. When participants did not shift to the audience perspective the post-hoc reasoning for doing so was consistently “I couldn’t see it the way they did” or “I liked mine better”. This suggests that some kind of appraisal of perspectives was occurring, and that this influenced the communication of participants in the present study.

The ability to appraise the adequacy of messages has long been theorized as an important component for the development of communication skills (Beal, 1996; Beal & Flavell, 1982; Nilsen & Graham, 2012; E. J. Robinson & Robinson, 1977). Research has also revealed that people sometimes incorrectly appraise the adequacy of their message resulting in poorly designed communication (Kruger et al., 2005; Kruger, Gordon, & Kuban, 2006). In related research, studies of expert-layperson communication has found that when producing messages the salience of one’s own perspective can increase the difficulty of appreciating the audience perspective, and this can reduce the likelihood of engaging in audience design (Bromme, Jucks, & Runde, 2005; Hinds, 1999). Other research indicates that people are biased to perceive their own creations as superior to those produced by others (Mochon, Norton, & Ariely, 2012; Norton, Mochon, & Ariely, 2012). It is possible that participants in the present study chose to ignore the perspective of the audience because they felt their own perspective was superior. How perspective appraisal influences audience design in referential communication is examined in the next chapter.
Chapter 4

4. Investigating the impact of estimates of communicative effectiveness and age upon audience design

4.1. Introduction

In the Chapter 3 experiment participants wrote descriptions for abstract tangram shapes for a specific audience. The audience was “specific” because the perspective of the audience for each tangram shape was made explicit by the experimenter. On most trials, a perspective mismatch occurred where the participant’s perspective (e.g., “Looks like an ice skater”) was qualitatively different to the perspective of the audience (e.g., “Looks like a piranha fish”). It was found that when writing a description for the specific audience to understand, participants often retained their own perspective rather than switching to the perspective of their partner; participants elected to use their own perspective on 38% of trials (on average). This behaviour runs counter to strategic models of interpersonal communication such as the collaborative model (H. H. Clark, 1996) and memory resonance (Horton, 2007) theories of communication. These theories predict that participants will describe the shapes from the perspective of the audience. Instead, results were more compatible with non-strategic models of communication such as the monitoring and adjustment (Keysar, Barr, & Horton, 1998) and interactive alignment (Pickering & Garrod, 2004) theories. These accounts argue that egocentric processes act as a barrier to audience design. Specifically, the salience of one’s own perspective and the ease of simply using one’s own perspective rather than expending the additional effort to take the perspective of the other reduces the likelihood of engaging in audience design (Garrod & Pickering, 2004; Keysar, 2007).

Another explanation for the egocentric communicative behaviour of participants was that a biased appraisal process influenced audience design (i.e., my description is better, or I can’t see it their way). However, the design of the previous study did not allow for a test of this explanation. The aim of the current experiment is to test if an appraisal process influences the decision of participants to retain their own perspective or change to the perspective of their audience in
their communication. Previous studies have argued that a lack of, or inaccurate, appraisal of perspectives by children contributes to their poorer performance on referential communication tasks compared to adults (Asher, 1976; Asher & Parke, 1975; Asher & Wigfield, 1981; Beal & Belgrad, 1990; Beal & Flavell, 1982; Meissner, 1978; E. J. Robinson & Robinson, 1977, 1982). While adult communicators have sufficiently developed perspective-taking ability, with associated message appraisal ability (Brennan et al., 2010; Brennan & Hanna, 2009; H. H. Clark, 1996; Echterhoff et al., 2009; Krauss & Fussell, 1996), they can still produce inconsiderate communication (Gann & Barr, 2012; Garrod & Pickering, 2004; Keysar, 2007; Mustajoki, 2012). For example, while experts might adjust their communication for laypeople by including less technical information (Bromme, Jucks, & Runde, 2005; Nuckles & Bromme, 2002; Nuckles et al., 2006), they often do not go far enough, leaving in technical details that can confuse the audience (Hinds, 1999; Hinds et al., 2001). It has been argued that the salience of the experts’ specialist knowledge can cause them to overestimate the knowledge of the audience, hence the inclusion of overly technical information. This tendency has been termed the curse of expertise (Hinds, 1999) or the curse of knowledge (Birch & Bloom, 2004).

Similarly, the salience of one’s own affective state can cause people to overestimate how transparent their emotional state is to others (Gilovich et al., 1998). This illusion of transparency also occurs in interpersonal communication, where speakers are found to overestimate the intelligibility of their communication (Fay et al., 2008; Keysar & Henley, 2002; Kruger et al., 2005). Interestingly this positive interpretative bias is not restricted to the self. Keysar (1994) found that people overestimated the ease with which a naïve third party will understand someone else’s ambiguous message. While the curse of knowledge has been identified as a factor that can impede audience design, the potential impact of the illusion of transparency on audience design has received less attention (Kruger et al., 2005). For example, it is not known if communicators will ignore the perspective of their audience during message construction if they consider their own perspective to be more transparent.

Recent research by Tamariz, Ellison, Barr, and Fay (2014) suggests that message appraisal influences people’s choice between using their own perspective or the perspective of their partner. Their study re-analysed prior research of Fay, Garrod, Roberts & Swoboda (2010) to model the spread of
language conventions in a simulated community of language users. Their findings suggested that the evolution of the spread of language conventions within a community occurs via an interplay between egocentric and content bias. More specifically, when encountering a new way of referring, the analysis suggested that people tend to re-use what they had used before (egocentric bias) unless the newly encountered reference is deemed superior (content bias). A limitation of the study was that content bias was not directly assessed via any measures of appraisal obtained from the language users. The role of appraisal upon reference choice was instead inferred by the overall modelled patterns of reference usage in the dataset. By obtaining measures of appraisal the present study will directly test the role that both appraisal of descriptions produced by oneself, and descriptions produced by the audience, has upon reference choice for the audience. Therefore the present study aims to extend upon the work of Tamariz et al. (2014) by providing a more direct assessment of the influence that description appraisal has upon description choice in a referential communication task paradigm.

The present study uses a modified version of the experimental procedure used in Chapter 3. Participants first wrote descriptions for a set of abstract shapes from their own perspective. Next they are then shown a set of written descriptions produced by another participant (person X) for the same set of shapes. For each shape, participants choose a description to send to person X. They must choose between their own personal description and person X’s description. It is hypothesized that the present study will replicate the findings reported in Chapter 3 - that there will be considerable variation in the extent that participants choose to give person X the description that person X produced. In the Chapter 3 experiment on average participants used their own perspective on 38% of trials. Participants in the present study were expected to behave in a similar fashion. However it is unknown if the forced choice nature of the present study, compared to the open-ended format of the Chapter 3 experiment, will increase or reduce the participants’ tendency to use their own shape descriptions.

A key extension of the present study was to obtain a measure of appraisal for personal descriptions, and person X descriptions. The present study will determine if description appraisal predicts description choice. More specifically, and consistent with arguments made by Tamariz et al. (2014), it is predicted that appraisal of one’s own description relative to appraisal of person X’s description will determine description choice. When participants believe their description to be superior to person X’s description they will be more inclined to choose their
own description to send to person X. When participants believe person X’s description to be superior to their own description they will be more inclined to choose person X’s description.

In line with prior research demonstrating an illusion of transparency, it is predicted that participants will over-estimate the effectiveness of their own descriptions (Fay et al., 2008; Kruger et al., 2005; Van Boven et al., 2003). Based on findings of Keysar (1994) it is expected that participants will also overestimate the effectiveness of the audience’s descriptions. Perceived effectiveness of one’s own and the audience perspective has not been previously compared in a referential communication task, so this is an exploratory comparison. Based on studies reporting that people are typically biased to perceive their own creations more favourably to the creations of others (Mochon et al., 2012; Norton et al., 2012), it is predicted that a similar bias will occur in the present study, such that participants’ personal descriptions will typically be perceived to be superior to the descriptions of others.

The present study also included a comparison group of older adults. Prior research has shown older adults tend to engage in less audience design compared with younger adults (Horton & Spieler, 2007; Hupet et al., 1993; Lysander & Horton, 2012; Schober & Carstensen, 2010). It was therefore expected that in the present study older adults would engage in less audience design. The design of the present study also allowed for an exploration of differences between older and younger adults in their description appraisal, and whether this can help to explain any difference between the two groups regarding audience design behaviour.

4.3. Method

4.3.1. Participants
Fifty six psychology students (Mean age = 22.50 years, 33 females) participated in exchange for partial course credit or payment. In addition, fifty six older adults from the general public were recruited in exchange for payment (Mean age = 60.52 years, 35 females). All participants in the older adult group were above 50 years old.

4.3.2. Apparatus and Procedure
Making personal descriptions. Participants first wrote personal descriptions for 18 abstract shapes called ‘tangrams’ (see Figure 4.1 for examples
and see appendix for the full set of tangrams used). The set of tangrams used in this experiment was the same set used in previous experiments of this thesis. Participants were instructed to write descriptions they would personally understand.

Figure 4.1. Examples of tangram shapes used in the current experiment. See appendix for the full list of tangrams used.

Choosing descriptions for a specific partner. For each of the 18 abstract shapes, participants were presented with their personal description, and a description made by a specific other person (called person X). Participants then chose which of the two descriptions should be used to communicate the shape to person X by checking a box next to the description. How this looked to participants is presented in Figure 4.2 below:

Choosing a description to give to a specific other person

In this part of the experiment, for all tangrams, you are required to choose a description to give to a specific person (person X) for them to be able to use the description to match it up to the appropriate tangram. This specific person has completed the same task of making their own descriptions that you completed prior to this part of the experiment. You need to choose between which description you want to give to person X... the description you made, or the description they made. Note that you want person X to be accurate at matching up the descriptions to the shapes. Please go through each tangram in order from the beginning. Once you have chosen for all 18 tangrams, click submit and then click on the ‘click to continue’ link and you will be taken to the next section of the experiment.
1. Your personal description for this shape is: Looks like a candle

   Person X's description for this shape is: This image looks like a lady kneeling down

   Please choose the description you want to provide to person X to try and match up to the appropriate tangram at a later time:

   □ Give them MY description
   □ Give them THEIR description

Figure 4.2. Instructions provided to participants when required to choose between their own and person X descriptions as part of the experiment. An example for the first tangram is shown. In the experiment the remaining 17 tangrams would have been listed below, one by one.

As seen in Figure 4.2, participants were required to make a forced choice for each tangram regarding whether to provide person X with their own personal description, or the description person X had previously made. This procedure was followed for each of the 18 tangrams. In contrast to the procedure adopted in Chapter 3, the forced choice procedure was conducted to simplify analysis, as the percentage of trials participants chose their own description could be used as a simple measure of egocentric communication. This contrasts with the procedure adopted in Chapter 3, which allowed for a more unconstrained response (participants wrote a description for the audience instead of directly choosing between two). The open-ended format used in Chapter 3 required a more complicated content analysis to determine the kind of audience design behaviour participants engaged in. Another benefit of the forced-choice procedure is that, by avoiding the need for participants to re-write their description (as done in Chapter 3), it reduces the chance of participants retaining their own perspective on account of it being easier to recall and reproduce.

The presentation order of personal and person X descriptions was counterbalanced across participants. Importantly, it was emphasized to
participants that their goal was to ensure that person X would be able to accurately pick out each shape from the description. The descriptions used for person X were obtained from personal sets of descriptions from participants in the current experiment. For example, participant three was given the set of personal descriptions made by participant two and informed that these descriptions were made by person X. In Chapter 3 the same audience descriptions were provided to all participants. However, in the current experiment the description set for person X differed for each participant. This was to ensure that audience design behaviour could not be attributed to the use of any single specific set of descriptions.

*Rating the effectiveness of each description.* After choosing the description to give person X for each of the 18 shapes, participants then rated the effectiveness of each description (i.e., those produced by themselves and those produced by person X). Specifically, participants noted whether they believed a random other person would be able to accurately pick out the intended shape from its associated description (a binary YES or NO rating). This was done on a tangram-by-tangram basis. So a participant would rate the effectiveness of both their personal description and person X’s description for the first tangram, then move on to the next tangram, and so on for all 18 tangram shapes. The presentation order of personal and person X descriptions was counterbalanced across participants. The percentage of trials that participants responded YES was used as a measure of perceived communicative effectiveness for personal and person X descriptions. For example, a participant who responded YES for 15 out of 18 trials (83.33%) when rating their own descriptions could be considered to have a more favourable attitude towards their own descriptions compared to someone whom responded YES for 10 out of 18 trials (55.56%).

*Matching the descriptions.* Two naïve participants acted as matchers by trying to identify each shape from its associated description for all tangram descriptions. The accuracy of the matchers was positively correlated ($Pearson r = .68$, $p < .001$). The accuracy score for each set of descriptions was obtained by averaging across the two matchers. This provided a measure of actual communicative effectiveness for personal and person X descriptions in the current experiment.
4.4. Results

4.4.1. Choosing descriptions for the audience

The proportion of trials that participants used their audience’s (person X’s) descriptions served as a measure of audience design. University student participants chose to give person X the descriptions produced by person X on 40.08% of trials (SD = 26.98%) rather than using their personal descriptions. This is significantly below chance (i.e., 50%) selection (single-sample \( t(55) = 2.75, p < .01 \)). Consistent with the results reported in Chapter 3, participants tended to behave egocentrically. On average, older adult participants chose person X descriptions on 26.29% of trials (SD = 15.87%). This is again below what would be expected by chance (single-sample \( t(55) = 11.18, p < .001 \)). As predicted, older adults gave their own perspective more often than younger adults (independent-samples \( t(110) = 3.30, p < .01, d = 0.64 \)). That is, older adults behaved more egocentrically than younger adults.

4.4.2. Perceived and actual communicative effectiveness

Mean perceived effectiveness of descriptions is presented in Figure 4.3. In the present study it was predicted that participants would perceive their own descriptions more favourably than the descriptions of person X. The mean perceived effectiveness score was entered into a 2x2 mixed design ANOVA, treating description type (personal, person X) as a within-participants factor and age group (younger adults, older adults) as a between-participants factor. This returned a significant main effect of description type \( [F(1,110) = 49.22, p < .001, \eta^2 = .31] \), indicating participants appraised their personal descriptions (\( M = 82.94\% \), SD = 18.61%) more favourably than the descriptions of person X (\( M = 66.17\% \), SD = 20.09%). Due to the finding that older adults behaved more egocentrically when choosing descriptions, the comparison between younger and older adult appraisal was also of interest. The ANOVA did not yield any significant main effect of age group \( [F(1,110) = 1.50, p = .22, \eta^2 = .01] \) or interaction between age group and appraisal of description type \( [F(1,110) = 2.33, p = .14, \eta^2 = .02] \). Therefore, while older adults’ communication tended to be more egocentric than younger adults (see section 4.4.1.), there was no significant difference in the appraisal of descriptions between the groups to help explain this.
How accurate were participants’ estimates of communicative effectiveness? First, the relationship between perceived effectiveness (percentage of trials participant believed descriptions would be understandable to a random other person), and actual effectiveness (percentage of trials the naïve matchers were able to accurately guess the correct tangram that corresponded to particular descriptions) was examined. For personal descriptions, the relationship examined is between participant’s perceived clarity of personal descriptions correlated with the actual accuracy of a naïve matcher. For person X descriptions, the relationship examined is between participant’s perceived clarity of person X description correlated with the actual accuracy of a naïve matcher. A weak positive relationship was found for personal descriptions ($\text{Spearman rho} = .26, p < .01$) and no significant relationship was found for person X descriptions ($\text{Spearman rho} = .17, p = .08$). Therefore results suggest that participants were able to predict their own success, but not well. Participants were unable to predict the success of other’s descriptions.

To examine the extent that participants over-estimated the clarity for both their personal and person X descriptions, an over-estimation score was created by subtracting actual communicative effectiveness from perceived communication effectiveness. Since there was found to be no significant difference between younger and older adults in terms of their perceived appraisal
scores, the scores from both groups are analysed as a single group for this analysis. The overestimation means for both personal and person X descriptions are reported in Figure 4.4. As expected, participants overestimated (i.e., overestimation score significantly different from zero) the effectiveness of both personal \([\text{single sample } t(111) = 16.13, p < .001]\) and person X descriptions \([\text{single sample } t(111) = 5.56, p < .001]\). Participants overestimated the efficacy of their personal descriptions more than they overestimated the efficacy of the descriptions produced by person X \([\text{paired samples } t(111) = 7.34, p < .001, d = .93]\). Thus, the illusion of transparency is stronger when appraising one’s own communication effectiveness, compared with appraising the communication effectiveness of others.

![Figure 4.4. Mean overestimation score for both personal and person X descriptions. Error bars represent standard errors of the means.](image)

4.4.3. The relationship between estimations of perceived communicative effectiveness and audience design

The main aim of the present study is to investigate the association between appraisal of descriptions and audience design. In the previous section it was established that older adults were less inclined to use the description of person X compared to younger adults, however no significant difference in description appraisal was observed between older and younger adults. Therefore, when assessing the association between appraisal and description choice all participants were examined as a single group.

Of particular interest was whether comparative appraisal of personal and person X descriptions would be associated with description choice. A measure of comparative appraisal was created by subtracting mean appraisal of personal descriptions from mean appraisal of person X descriptions. A positive score on this measure indicated that a participant believed person X descriptions were
generally more understandable compared with their personal descriptions, and a negative score indicated that a participant generally believed their personal descriptions were more understandable compared to person X’s descriptions. A strong positive correlation between comparative appraisal and description choice (Pearson r = .62, p < .001) indicates that participants appraising the descriptions of person X more favourably in comparison to their own personal descriptions, were more likely to choose person X’s descriptions for person X. The reverse implication of this association is that participants appraising their own personal descriptions more favourably in comparison to their appraisal of person X descriptions, were more likely to choose their personal descriptions for person X. Earlier, it was reported that participants commonly believed their personal description was superior, and therefore explains why participants tended to behave egocentrically in the present study.

4.4.4. Further exploring relationship between appraisal of descriptions and audience design

The relationship reported in the previous section between combined appraisal score and description choice provides a general understanding of how participants’ appraisal of descriptions influenced their description choice for the audience. However it was also of interest to further examine description appraisal to gain a more detailed understanding of how particular instances of combined appraisal influenced description choice. In the present study when appraising descriptions three different appraisal types were possible on any particular trial:

- **Person X description superior;** personal description not believed understandable to a random other person, while person X description is believed to be so.

- **Descriptions equal;** both personal and person X descriptions are believed to be understandable, or not understandable, to a random other person.

- **Personal description superior;** personal description is believed to be understandable to a random other person, while person X description is not believed to be so.

Inspection of frequency histograms revealed strong positive skew for the ‘person X superior’ appraisal type, therefore when comparing the prevalence of the appraisal types nonparametric analyses were conducted. No significant difference was found between younger and older adults in their mean proportions of all
three description types [all Mann Whitney Us ≥ 1286.50, zs ≤ -1.64, ps ≥ .10].
Therefore younger and older adult data was combined. Analysis revealed a
significant difference in the prevalence of appraisal types [Friedman Test $\chi^2(2) = 133.45, p < .001$]. Bonferroni adjusted follow up comparisons revealed that
‘descriptions equal’ ($M = 63.10\%$, $SD = 17.80\%$) was the most common appraisal
type, followed by ‘personal descriptions superior’ ($M = 27.48\%, SD = 18.71\%$), and
finally ‘person X descriptions superior’ ($M = 9.43\%, SD = 12.50\%$) [All Wilcoxon
Signed Rank Test $zs \geq 6.11, ps \leq .001$].

To gain a more detailed understanding of the relationship between
description appraisal and audience design, the probability that a participant
would choose person X’s description for each appraisal type was analysed. The
binary response on any particular trial (i.e., choose personal or person X
description) was the dependent variable, with appraisal type category (i.e., person
X superior, equal, and personal superior) as the predictor variable.

The design of the present study included multiple observations for each
participant that poses a problem for a standard binary regression due to non-
independent observations. However this issue can be overcome by using a mixed
effects modelling approach (Hamilton, 2013). The presence of multiple trials per
participant can be controlled for by including participant as a random factor in the
prediction model. This kind of statistical methodology has been gaining increasing
popularity (Janssen, 2012; Judd, Westfall, & Kenny, 2012; Quene & van den Bergh,
2008). In the present study a binary logistic regression was performed treating
description choice as the binary outcome variable and appraisal type as a
categorical fixed effect predictor while also including intra-participant variation as
a random effect (random intercept). Data was analysed using the statistical

Analysis revealed a significant overall effect of appraisal type indicating
that the predictors as a set reliably distinguished between description choice for
person X [Wald $\chi^2(2) = 205.09, p < .001$]. Summary coefficients are presented
below in Table 4.2. Using the STATA post estimation options, a predicted value for
each trial was produced (Rabe-Hesketh & Skrondal, 2012b). These values were
averaged across appraisal types to obtain a predicted probability that a
participant would choose to provide person X with person X’s description. Results
were consistent with expectations. When participants believed person X’s
description to be superior, the probability of choosing person X’s description was
high ($M = 80\%$ chance, $SD = 12\%$). When participants believed their personal
description to be superior the probability of choosing person X’s description was low (\(M = 10\% \text{ chance, } SD = 10\%\)). When appraisal of descriptions was equal chances of choosing person X’s description was less than 50\% (\(M = 35\%, SD = 18\%\)). Therefore, when participants appraised descriptions to be equal in clarity it was slightly more likely that a person would choose their own personal description for person X. Results therefore indicate that only on trials when participant’s believed person X’s description to be superior they were likely to choose person X’s description. Earlier it was reported that this appraisal type occurred with the lowest frequency (\(M = 9.43\%, SD = 12.50\%\)), and this explains why using person X’s description occurred less often than using one’s one description in the present study.

Table 4.2. Coefficients for mixed effects logistic regression analysis predicting description choice from description appraisal with participant included as a random factor

<table>
<thead>
<tr>
<th></th>
<th>Estimate (B)</th>
<th>Std. Error</th>
<th>Z value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed effect (appraisal type)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept – personal superior</td>
<td>-2.35</td>
<td>.19</td>
<td>-12.34*</td>
<td>(-2.73) – (-1.98)</td>
</tr>
<tr>
<td>descriptions equal</td>
<td>1.59</td>
<td>.18</td>
<td>9.10*</td>
<td>(1.25) – (1.94)</td>
</tr>
<tr>
<td>personal X superior</td>
<td>3.72</td>
<td>.26</td>
<td>14.30*</td>
<td>(3.21) – (4.23)</td>
</tr>
<tr>
<td>Random effect (participant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept - participant</td>
<td>1.06</td>
<td>.11</td>
<td></td>
<td>(0.87) – (1.30)</td>
</tr>
</tbody>
</table>

*\(p < .05\)

4.5. Discussion

The present study replicated and extended Chapter 3 of this thesis by obtaining estimates of communicative effectiveness from participants in a forced-choice referential communication task. Consistent with Chapter 3 findings, on a high proportion of trials University students decided to provide the audience with their own personal perspective (Mean = 59.92\% of trials) rather than shift to the audience’s perspective (Mean = 40.08\% of trials). Also consistent with prior research, older adults behaved more egocentrically than younger adults, on
average using their personal perspective on 73.71% of trials (Horton & Spieler, 2007; Hupet et al., 1993; Lysander & Horton, 2012; Schober & Carstensen, 2010). More specifically, in the present study the older adult group used their own personal perspective significantly more often than the younger adults when communicating to an audience whose perspective was known to the participant. In the Chapter 3 study, post discussion with participants revealed there appeared to be an appraisal process occurring that was influencing audience design. The results of the present study support this explanation as participant appraisal of descriptions significantly predicted audience design. When participants believed the audience description to be superior to their own they were very likely to choose the audience description (80% chance), and when participants believed their own description to be superior to that of the audience they were very likely to choose their personal description (90% chance). When appraisal of the effectiveness of own and audience descriptions was equal, it was likely that participants would choose their personal description (65% chance). It was found that participants believed descriptions to be of equal effectiveness most often (Mean = 63.10 % of trials), followed by believing their own description to be superior (Mean = 27.48% of trials), and least frequently believing the audience description to be superior (Mean = 9.43% of trials). Therefore when considering the prevalence of the different appraisal types, and the likelihood of choosing the audience description based on the type of appraisal, it becomes clear why participants chose their own description more often than the audience description. These results support recent arguments made by Tamariz et al. (2014) that biased appraisal of the perspective held by both oneself and the audience can influence a person to communicate their own perspective even when the perspective of the audience is readily available for consideration.

Results of the present study therefore support the hypothesis that appraisal of descriptions is associated with description choice for the audience, and results were also found to support the hypothesis that older adults are less inclined to use the audience perspective compared to younger adults. However, older adults and younger adults were not found to significantly differ in their appraisal of the shape descriptions. Therefore, while the present study supports previous findings that older adults are more egocentric in their referential communication, differences in description appraisal cannot account for this. Previous studies comparing audience design with younger and older adults have argued for memory deficiencies as the primary causal factor for communication
differences (Horton & Spieler, 2007; Hupet et al., 1993; Lysander & Horton, 2012; Schober & Carstensen, 2010). The design of the present study posed no demands on participant memory, since the perspective of the participant and their audience were directly accessible when participants were choosing between descriptions. Future research is required to better understand the tendency of older adults to be more egocentric in referential communication tasks compared with younger adults.

In Chapter 3 it was found that even in a referential communication task that afforded participants every opportunity to cater to the audience perspective, participants frequently behaved egocentrically. These results highlight the egocentric nature of interpersonal communication, and support non-strategic models of communication (Garrod & Pickering, 2004; Keysar, 2007). Similar findings to Chapter 3 were replicated in the present study, and were extended by finding evidence for the influence of description appraisal on description choice. The decision to use personal descriptions rather than the audience’s description stemmed from a bias towards appraising one’s own description as superior to that of the audience. In the present study, when participants communicated their own perspective to the audience they believed they were doing the audience a favour by providing the audience with a “better” way of seeing things. This finding is partially consistent with strategic models of communication, as findings indicate a strategic cognitive estimation process underlying description choice (H. H. Clark, 1996; Horton, 2007). However, this strategic process was found to contain an egocentric bias that influenced participants to communicate in a way that is partially consistent with egocentric models of communication. Therefore the present study supports a role for both strategic estimation and non-strategic egocentric bias as factors influencing audience design.

Participants were optimistic with respect to the perceived clarity of their personal and the descriptions produced by their audience. By comparing perceived description clarity with actual clarity it was found that participants over-estimated the effectiveness of both personal and audience descriptions, and this over-estimation was greater for personal descriptions. These findings are consistent with studies reporting an illusion of transparency in communication whereby people tend to believe both their own communication, and communication of others, is clearer to other people than it is in reality (Fay et al., 2008; Keysar, 1994; Kruger et al., 2005; Van Boven et al., 2003). The finding that participants typically had a greater illusion of transparency for their personal
descriptions compared with audience descriptions is consistent with studies reporting that people tend to value their own creations more than similar creations made by others (Mochon et al., 2012; Norton et al., 2012). Low correlations between estimated and actual clarity of descriptions revealed that participants were not very accurate in their assessments of description clarity. The basic strategic reasoning that influenced description choice in the present study can be summarised as “I will provide the audience with my description instead of their description because my description is clearer” is misguided.

It is assumed that to communicate effectively individuals should design their messages from their audience’s perspective (Bromme et al., 2001; Echterhoff et al., 2009; Horton & Gerrig, 2002; Jucks & Bromme, 2011; Krauss & Fussell, 1996). The present study indicates that it should not be assumed that people typically design their messages from the perspective of their audience, at least during written communication, because a biased appraisal of perspectives can drive egocentric behaviour. The present study supports the position that egocentric processes have more influence in interpersonal communication than traditionally thought (Garrod & Pickering, 2004; Keysar, 2007).

The assumption that people tailor their communication to their audience when information about the audience is available is especially strong within research on writing effective school materials (VanLehn et al., 2007) and on asynchronous (e.g., over email) expert-layperson communication. The expert-layperson research has largely focused on how experts’ estimations of layperson knowledge can influence audience design (Bromme et al., 2001; Fussell & Krauss, 1992; Isaacs & Clark, 1987; Wittwer, Nuckles, & Renkl, 2008). However research has also investigated how providing specific information about the audience can facilitate audience design by helping the expert to be more accurate in their estimation of layperson knowledge (Nuckles et al., 2006; Nuckles et al., 2005). The current experiment suggests that even if experts can be helped to avoid falling prey to a curse of knowledge by providing specific details about the audience perspective, biases that occur during perspective appraisal may continue to act as a barrier to effective audience design.

Findings of the present study are also consistent with recent research investigating the so-called IKEA effect (Mochon et al., 2012; Norton et al., 2012). This research describes how egocentrism influences people to perceive their own creations as more valuable than similar creations made by others. In the present study, it was found that participants typically rated their own descriptions as
superior to descriptions produced by others. Chapter 4’s results suggest that a similar egocentric bias exists for appraisal of one’s communicative creations.
5. General Discussion

This PhD thesis has investigated a number of factors that influence how people design their communication using a referential communication task paradigm. These factors included the degree of interaction with the audience (Chapter 2), group size (Chapters 2 & 3), majority influence (Chapter 3), estimates of communicative effectiveness (Chapter 4), and age (Chapter 4). These factors are discussed under different headings in this final discussion section.

5.1. Factors influencing audience design: Amount of feedback

Feedback from the audience can heavily influence audience design. Feedback can provide the message producer with information about what the audience does and does not know. According to the collaborative model of communication, feedback from the audience allows for the build-up and maintenance of common ground between conversational partners (H. H. Clark, 1996; H. H. Clark & Brennan, 1991; H. H. Clark & Wilkes-Gibbs, 1986). In other words, a message producer can use information gained via feedback to enable the design of communication to be appropriate for the audience perspective. However, Garrod and Pickering have argued the opposite in their interactive alignment model of communication (Garrod & Pickering, 2004, 2009; Pickering & Garrod, 2004, 2006, 2013). That is, when immediate feedback is available from the audience the message producer does not need to engage in audience design as any misunderstandings can be heralded by the audience as they occur. According to the interactive alignment model people in conversation do not need to actively design their communication as an automatic priming process can create and maintain aligned perspectives. Garrod and Pickering concede that when the partner provides feedback of misunderstanding, audience design may be required in what they term an interactive repair process. Garrod and Pickering argue against a primary role for explicit audience design in typical everyday conversation. However as was discussed in the introduction to this thesis, allowing for implicit audience design as suggested by Richard Horton and colleagues might be a way to recognise audience design while still accounting for

In the series of experiments reported in Chapter 2 of this thesis, participants engaged in either an interactive or non-interactive referential communication task where the audience size was varied across conditions. An additional group of participants wrote personal descriptions that were only intended for themselves to comprehend. It was found that in the interactive conditions, the director’s first utterance did not differ in word length from the participants that only wrote personal descriptions. This suggests that at the outset of the interaction directors were not engaging in any audience design which supports the interactive alignment model contention that feedback (or at least the possibility of immediate feedback) can reduce the need for audience design (Garrod & Pickering, 2004; Pickering & Garrod, 2004, 2013). Consistent with the well-established research literature, over repeated reference the number of words required to communicate the shapes steadily declined as participants collaboratively developed referring conventions (e.g., “the ice skater”) (Brennan & Clark, 1996; H. H. Clark & Wilkes-Gibbs, 1986; Duff et al., 2006; Fay, Garrod, et al., 2010; Galantucci, 2005; Krauss & Weinheimer, 1964).

The results reported in Chapter 2 add to the literature by illustrating the development of referring conventions when the director was required to communicate to a small group of people over multiple trials. Prior studies have only investigated pairs (e.g., H. H. Clark & Wilkes-Gibbs, 1986), or triads (e.g., Horton & Gerrig, 2005b). A point of contention in the literature surrounds the amount of audience design that occurs during the development of referring conventions. The common ground explanation for the development of referring conventions provided by Clark and Wilkes-Gibbs (1986) has been criticised by other researchers that have claimed the development of conventions is possible via purely egocentric processes (Barr, 2004; Pickering & Garrod, 2004). However more recently researchers have been presenting findings that defend the role of common ground as having an important role for the development of referring conventions (Brown-Schmidt, 2009, 2012; Brown-Schmidt & Hanna, 2011; Horton & Slaten, 2012). The experiments reported in Chapter 2 of this thesis unfortunately are unable to add any insight into this particular debate. However a result from Chapter 2 that can add to the research literature was found by comparing the number of words used by directors in the non-interactive conditions, with the first utterance made by the directors in the interactive
conditions. It was found that participants producing descriptions in the non-
interactive conditions produced longer descriptions compared to the first
utterance made by directors in the interactive conditions. Therefore, while there
may be potential for audience design that caters to the specific perspective of the
audience after obtaining specific feedback from that audience, findings reported
in Chapter 2 suggest that when unable to receive any feedback from an intended
audience more initial communicative effort is put into the communication. This is
consistent with prior research comparing non-interactive with interactive
conditions in communication tasks (Gann & Barr, 2012; Schober, 1993).

Another finding from Chapter 2 was that the addition of more matchers in
the interactive version of the task increased the level of interaction amongst
participants. With four matchers, the communication was characterized by
shorter turns and an overall increase in matcher feedback compared to when
there was two matchers, which was in turn more interactive compared to only a
single matcher. Having more matchers was associated with a greater number of
words on the initial discussion of the shapes. However the rate of reduction in
words across successive referrals was faster with more matchers present so that
by the fourth reference all conditions were equal in regards to the number of
words required. Therefore results demonstrated that the addition of extra
matchers (with presumably varied perspectives) required more overall effort to
complete the task at the outset, however the increased level of interaction
associated with the extra matchers enabled the group to come to a consensus on
how to refer to the stimuli efficiently and quickly. In a study by Fay et al., (2000) it
was found that small 5-person discussion groups were more interactive than large
10-person discussion groups. This suggests that if an interactive condition had
been included with nine or more matchers in Chapter 2, communication in this
condition would likely have been less interactive compared with the condition
containing four matchers. This raises the interesting possibility that the degree of
interaction in referential communication tasks may follow an inverted U-curve
trend where the degree of interaction increases as matchers are added up until a
certain point, and then begins to decrease. If this were to prove to be the case it
would have implications for tutoring practices. A long standing general principle is
that one-on-one tutoring is the ideal context for student-teacher interaction (Chi,
Roy, & Hausmann, 2008). However, if small groups facilitate more teacher-
student interaction, there may be certain circumstances where small group
tutoring is superior to one-on-one teaching. This is an avenue for future research.
5.2. Factors influencing audience design: Group size

Research examining the influence of group factors upon audience design has been limited to experiments examining how people conceal information from a side-participant in a conversation (H. H. Clark & Schaefer, 1992; Fleming, 1994; Fleming & Darley, 1991; Fleming et al., 1990), and studies where the participant develops different conventions with two different addressees (Horton & Slaten, 2012; Metzing & Brennan, 2003). One study that focused more specifically upon group processes was conducted by Fay et al., (2000) who argued that audience design is influenced by group size. That is, as the number of addressees increase, a message producer will be more inclined to further design their communication in order to accommodate the presence of multiple perspectives. The main goal of Chapter 2 of this thesis was to examine the influence of group size on audience design.

In the non-interactive version of the referential communication task used in Chapter 2, participants were told their descriptions would be later given to an audience which consisted of one, five or ten people. There was no significant difference in the mean number of words produced across these conditions. Therefore results suggested that participants were operating from a principle that a description made for a single audience member should also be good enough for multiple audience members. In the interactive version of the task, experimental groups consisted of a single director with a single matcher (1matcher condition), a single director with two matchers (2matcher condition) and a single director with four matchers (4matcher condition). There was no significant difference found between interactive groups for the number of words produced on the director’s first turn. Therefore an increase in audience size did not result in more audience design in the interactive version or the non-interactive version of the task. The first study of this thesis reported in Chapter 2 therefore found no evidence of increased audience design due to increasing group size in a referential communication task. A limitation of the interactive version of the task used in Chapter 2 was that unlike Fay et al. (2000), a 10-person interactive group condition was not included. Results demonstrated that director’s did not behave any differently as the audience size increased from 1-5, however the possibility remains that a tipping point may exist where a director comes to perceive a qualitative difference in their audience due to the size (e.g., the difference between recognizing communication style required for a small class versus a
In the experiments reported in Chapter 2, before the task began participants were unaware of the perspective of their audience. Having participants completely naïve or unsure of the audience perspective at the outset of the task is the most common procedure for the majority of prior referential communication studies (For a review see: Galantucci & Garrod, 2011). This is a deliberate action taken by the researchers in these studies as the typical purpose of the research is to examine how participants negotiate meaning over successive referrals for novel stimuli. This allows for the examination of how language conventions evolve over time. Some studies have employed a design where a series of pair-wise interactions are conducted in order to experimentally develop a community of language users (For reviews see: Fay, Garrod, et al., 2010; Galantucci & Garrod, 2011). In these studies participants become aware over time that it is likely that the next participant they will be interacting with will share some (or all) of the conventions that have been communicated with prior partners. This research has demonstrated that as participants become part of a linguistic community perspectives become shared (or aligned) at the community-level. Therefore on subsequent interactions even before communication begins aligned perspectives are present. When studying a communicative situation where participants share the same perspective it can be difficult to discern whether communication is tailored specifically for the audience or whether participants are simply communicating from their own point of view that just happens to be the same as their audience (For a discussion see: Keysar, 1997).

Therefore, in Chapter 3 the potential influence of group size upon audience design was revisited using a modified referential task that made the perspective of the audience explicit to the participant at the outset of the task, and examined communication in a context where perspectives between the participant and audience were misaligned.

In the experiment reported in Chapter 3, participants began by devising their own personal descriptions for the tangram shapes used as stimuli (the same shapes that were used in the experiments reported in Chapter 2). This served to establish the participant’s own perspective on each of the shapes prior to any communication for an audience. Subsequently, one group of participants were required to write descriptions for the same shapes again and were instructed that the descriptions would be given to a specific other person. This person was
specific because the participant was provided with the personal descriptions of this particular audience. Therefore at the point of writing descriptions for the audience the participants were aware of both their own perspective and the audience perspective for the shapes. Of particular interest were trials where perspectives were misaligned. For example, for one shape the participant may have perceived it as “superman flying” however their audience perceived it as a “piranha fish”. Previous referential communication studies requiring communication about spatial location have examined an analogous communicative situation: The message producer is confronted with explicitly misaligned spatial perspectives (Galati & Avraamides, 2013a; Schober, 1993, 1995, 2009). These studies have consistently reported that participants predominately used the perspective of the audience in their descriptions (e.g., “It’s the one on your left” instead of “It’s the one on my right”). In the Chapter 3 experiment, participants were required to communicate abstract conceptual information (e.g., “It looks like an ice skater”) instead of spatial location. Participants frequently adopted the perspective of the audience in their descriptions for a single specific audience (e.g., using audience “piranha fish” perspective instead of one’s own “superman flying” perspective), however this was not the only response ($M = 43\%$ of trials). Instead of always using the audience perspective participants were also found to use other strategies such as combining their own perspective with that of the audience ($M = 11\%$), devising an entirely new conceptualisation ($M = 9\%$), modifying their own original perspective ($M = 36\%$), or retaining their own perspective without any modification ($M = 2\%$).

One research question examined in Chapter 2 was whether the inclination of participants to adopt the audience perspective would be increased if they were confronted with a group audience containing three different perspectives (e.g., “piranha fish”, “ice Skater”, and “ballerina”). Making it clear to participants that the audience consisted of multiple different perspectives may have helped participants recognise how ambiguous and diverse perspectives upon the shapes could be, therefore inspiring them to be more willing to tailor communication for the audience (Fay et al., 2000). Or, there was also the possibility that participants may have found the number of perspectives overwhelming and therefore simply offered their own personal perspective to the audience as an alternative to consider. However no significant overall mean difference in the pattern of responding was found between participants communicating to a group audience compared to those communicating to a single audience member. Therefore, the
results reported in Chapter 3 were consistent with, and extended upon the findings of Chapter 2 by finding that increasing audience size does not promote audience design.

5.3. Factors influencing audience design: Majority influence

In Chapter 3 a group audience containing three different perspectives was not found to increase the amount of audience design compared to communication for a single specific audience member. A final condition was included in Chapter 3 to investigate whether the presence of a majority perspective within the group audience would facilitate more audience design. This expectation was based on the findings of classic social psychology studies that have demonstrated that human judgement can be swayed by majority influence (Asch, 1956; Cialdini & Goldstein, 2004; Cialdini & Trost, 1998), and studies showing that greater perceived community endorsement can increase the communication of stereotypes (A. E. Clark & Kashima, 2007; Kashima, 2014). More specifically, it was hypothesized that participants communicating to a group audience containing a majority perspective (e.g., “piranha fish”, “ice Skater”, “piranha fish”, “ballerina”, and “piranha fish”) would be more inclined to adopt the majority perspective (i.e., “piranha fish”) when communicating to this audience compared to participants communicating to an audience where there was no clear majority (e.g., “piranha fish”, “ice skater”, and “ballerina”). This was found to be the case. Participants communicating for an audience containing a majority perspective shifted away from their own personal perspective and adopted the audience perspective twice as often ($M = 64\%$ of trials) compared to participants communicating to a group audience that contained no clear majority ($M = 32\%$ of trials). Furthermore, when participants shifted to an audience perspective in the majority present condition it was predominately to the majority perspective (71% of the time), whereas in the majority absent condition when participants shifted to the audience perspective they were most likely to make an attempt to combine multiple audience perspectives (51% of the time).

This findings presented in Chapter 3 are consistent with classic studies such as those using an Asch type paradigm that have demonstrated a basic human tendency to conform to majority opinion in our judgments (Cialdini & Goldstein, 2004). Despite two out of the five members not sharing the majority view,
participants were still heavily influenced to shift to the majority perspective in their communication for that audience. Therefore despite the classic finding in the Asch type paradigm that the presence of a dissenter significantly reduces conformity effects, the present research found a strong conformity effect in the presence of a less than unanimous majority. This suggests that the type of response required (e.g., stating a personal judgment versus producing an informative communicative act) can influence the degree of conformity effects. Further investigation of this issue is an avenue for future research.

Chapter 3 adds to the research literature by being the first study to demonstrate majority influence in a referential communication task paradigm. It was previously mentioned that some research has employed a paradigm where a series of pair-wise referential communication interactions are conducted in order to experimentally produce a simulated community of language users (For reviews see: Fay, Garrod, et al., 2010; Galantucci & Garrod, 2011). An avenue for further research would be to explore whether a series of group-level interaction processes impact upon the development of a simulated community over time differently to a series of pair-wise interactions.

Another avenue for future research could be to investigate the impact of majority influence upon the saying-is-believing effect (Echterhoff et al., 2009; Higgins, 1992; Higgins & Rholes, 1978; Stukas, Bratanova, Peters, Kashima, & Beatson, 2010). The saying-is-believing effect has been demonstrated by requiring participants to describe a target person to an audience who the participant is informed has a certain attitude towards the target person (e.g., positive or negative attitude). It has been consistently reported that participants tailor their description of the target person to be consistent with the attitude of the audience. Additionally, later memory recall of the target person is found to be consistent with how the participant tailored their communication (i.e., saying-is-believing). This is likely to be a research paradigm that could incorporate modifications in order to further investigate how majority influence impacts both message production and recall (For example see: Hausmann, Levine, & Higgins, 2008).
5.4. Factors influencing audience design: Estimates of communicative effectiveness

In Chapter 3, it was found that participants would sometimes choose to ignore the audience perspective and instead offer the audience their own personal perspective. The experimental task was non-interactive, therefore the participant was fully aware that the audience could not ask for clarification if they could not understand. The rational choice for participants was to abandon their personal perspective in favour of the audience perspective to maximise the clarity of communication. Therefore when participants chose to stick with their personal perspective their communication appeared extremely egocentric. When participants were verbally queried about their choice to ignore the perspective of the audience the common response was “I couldn’t see it the way they did” or “I liked mine better”. This was consistent with literature suggesting that the salience of one’s own personal perspective can act as a barrier to perspective taking and associated audience design (Bromme, Jucks, & Runde, 2005; Hinds, 1999; Hinds et al., 2001; Kruger et al., 2005; Kruger et al., 2006) and recent research suggesting that comparative appraisal of perspectives influences communication (Tamariz et al., 2014). In Chapter 4 an experiment was conducted that explored this potential underlying reason for the seemingly egocentric behaviour observed in Chapter 3.

In Chapter 4 participants first wrote personal descriptions for the same set of tangram shapes used in the experiments conducted in the previous two chapters. Like the Chapter 3 experiment participants were then provided with the audience perspective and asked to choose between their own personal and the audience perspective when communicating to the audience. Unlike Chapter 3, a forced choice procedure was implemented instead of requiring participants to write out descriptions. This was done to simplify the task requirements and the analysis. Consistent with Chapter 3 results, participants provided their own personal perspective to the audience (instead of adopting the audience perspective) on a high proportion of trials ($M = 59.92\%$ and $73.31\%$ of trials for younger and older adults, respectively). In the second phase of the experiment participants rated whether they believed the descriptions (both own, and audience) would be understandable to another random other person (YES/NO judgement). Later, two naive participants attempted to accurately match the descriptions produced in the experiment to the array of tangram shapes used.
This enabled a comparison of estimates of communicative effectiveness to actual effectiveness.

Consistent with studies finding evidence for an *illusion of transparency* during communication, participants in Chapter 4 tended to over-estimate the communicative effectiveness of their own personal descriptions (Fay et al., 2008; Keysar & Henley, 2002; Kruger et al., 2005). Participants also tended to over-estimate the effectiveness of the audience descriptions, consistent with findings reported by Keysar (1994). Evidence suggested that participants were exhibiting a self-serving bias by rating their own descriptions superior to the audience descriptions. This is consistent with the research literature that has demonstrated the *better-than-average effect* (For reviews see: Guenther & Alicke, 2010; Loughnan et al., 2010), and also literature that suggests people are biased to value their own creations more highly than the creations of others (Mochon et al., 2012; Norton et al., 2012).

Of primary interest in the Chapter 4 experiment, was whether estimates of communicative effectiveness of descriptions would predict whether participants would retain their perspective or shift to the audience perspective during communication. Indeed, appraisal of the effectiveness of descriptions was found to significantly predict perspective choice. As expected, when a participant perceived their description to be effective, and the audience description to be less effective, this led them to ignore the audience description in favour of their own, despite the goal of the task to be as clear to the audience as possible. Therefore, Chapter 4 provided evidence suggesting that the illusion of transparency is a cognitive bias that can inhibit audience design. This chapter added to the research literature by conducting a direct assessment of this bias upon perspective choice during communication. One further avenue for research is to investigate how this bias might negatively effect, and how its impact might be reduced, in a range of practical communication situations, such as: Expert-layperson communication and education (Chi et al., 2008; Chi, Siler, & Jeong, 2004; Nuckles et al., 2006; Nuckles et al., 2005; Wittwer et al., 2010; Wittwer et al., 2008), relationship disputes (Markman, Renick, Floyd, Stanley, & Clements, 1993), business negotiations (Galinsky, Maddux, Gilin, & White, 2008; Galinsky & Mussweiler, 2001; Neale & Bazerman, 1983; Van Boven et al., 2003) and other conflict situations (Balliet, 2010).

A common practice by researchers investigating audience design is to focus on specific behavioural communication acts when searching for instances of
egocentric or considerate communication. The cognitive bias reported in Chapter 4 illustrates how an act that on face value appears very egocentric in nature, may instead best be conceptualised as strategic. An implication of this finding is that much of the evidence cited to argue for the highly egocentric nature of communication (e.g., see Keysar, 2007) may be overlooking a potentially strategic aspect to communication acts that are claimed as purely egocentric in nature. Therefore studies that ignore the motivations that drive specific communication acts may end up making conclusions that represent an over-estimation regarding the amount of egocentrism present.

Another issue is the level of conscious control people have over this strategic comparative judgment process during communication. Chapter 4 findings can be thought of as participants following a rule of thumb (or heuristic) when choosing a description to provide their audience. That is, if their own perspective is judged superior to the audience, then their own perspective is used; if both perspectives are judged to be of equal quality, their own perspective is used; if the audience perspective is judged to be superior, then the audience perspective will be accommodated to. Precisely how consciously aware of this judgment process participants were is beyond the scope of this thesis, and is an avenue for future research. Participants did hint at some conscious awareness of the process when queried after the experiment as explanations for description choice were consistently articulated in terms like “I liked mine better” and “I couldn’t see it their way”.

5.5. Factors influencing audience design: age

In Chapter 4 a comparison between an older adult group and a younger adult group was conducted as previous referential communication studies have provided evidence to suggest that older adults are less inclined to engage in audience design (Horton & Spieler, 2007; Hupet et al., 1993; Lysander & Horton, 2012; Schober & Carstensen, 2010). The most common explanation for this difference has been to appeal to a memory disadvantage for older adults (Horton & Spieler, 2007; Hupet et al., 1993; Lysander & Horton, 2012; Schober & Carstensen, 2010). In the Chapter 4 experiment when choosing a description for the audience both own and audience descriptions were provided. Therefore in the experiment memory requirements were arguably minimal to non-existent. Despite this, a significant difference between the propensity of younger and older adults to abandon their own perspective in favour of the audience perspective
was observed ($M = 40.08\%$ and $26.29\%$ of trials for younger and older adults, respectively). Therefore, consistent with prior research Chapter 4 results suggested that older adults were less inclined to design communication for the audience compared with younger adults. This discrepancy was not found to be associated with any differences in appraisal of descriptions however, and as mentioned memory differences are also an unlikely explanation. Future research is required to further explore potential reasons underlying differences in the propensity of younger and older adults to engage in audience design.

One possible underlying reason potentially worth exploring is how there may be differences in the level of confidence that younger and older adults generally have in their own perspective. Younger adults are typically in a stage of identity formation whereby they remain open to new experiences as they explore what they like and do not like (Tesch, & Cameron, 1987). As adults progress into middle and late adulthood they solidify their attitudes and beliefs. This confidence in their own judgment may translate into a stronger sense of authority. Research has shown that a sense of power may act as a barrier to engaging in full consideration of their perspective of others (Galinsky, et al., 2006). Therefore, judgments of confidence, authority, and power may be linked to the discrepancy between younger and older adult communication choices in the paradigm used in Chapter 4. This is an avenue for future research.

5.6. Some final considerations and future directions

While Chapters 3 and 4 revealed some significant findings, the experiments reported in these Chapters employed an entirely non-interactive design. Therefore any generalisation of the findings reported from these Chapters to an interactive communicative context must be made with caution. Future research is therefore required to further explore how factors such as majority influence, estimates of communicative effectiveness, and age impact upon audience design in interactive versions of referential communication tasks. However, findings from non-interactive communication tasks are still informative. This is because less interactive modes of communication such as email (Cohen, 1992) and phone text messaging (Fussell, Kraut, Gergle, & Setlock, 2005) have become an everyday occurrence in the lives of millions of individuals worldwide. In addition, Facebook is a communication phenomenon that has become incredibly popular since beginning in 2004 (A. E. Clark & Kashima, 2007). Arguably, the prevalence of less
interactive modes of communication makes it just as important to investigate as highly interactive communication (e.g., face-to-face conversation).

This thesis has investigated a number of different factors that can influence audience design. However the list of factors that influences audience design behaviour is likely to be very long and it was impossible for this thesis to test every possibility. Factors examined in this thesis were chosen on the basis of existing research to justify their investigation. Some examples of other factors not examined by this thesis that have been mentioned in the literature are: Time pressure (Horton & Keysar, 1996; Robnagel, 2000, 2004), power and role differentials (Galinsky, Magee, Inesi, & Gruenfeld, 2006; Ladegaard, 1995), communication goals (Echterhoff, Higgins, Kopietz, & Groll, 2008; Russell & Schober, 1999; Yoon, Koh, & Brown-Schmidt, 2012), the need for closure (Kruglanski, Pierro, Mannetti, & De Grada, 2006; Richter & Kruglanski, 1999; Webster, Kruglanski, & Pattison, 1997), and empathy (Bailey, Henry, & Von Hippel, 2008). There are likely many more factors that are yet to be uncovered. As has been noted by Gann and Barr (2012) there is currently no clear unified theory of audience design in the research literature. More research is required to investigate specific cognitive processes involved in audience design such as explicit consideration of common ground (Brown-Schmidt, 2012; H. H. Clark et al., 1983), or implicit memory resonance (Horton & Gerrig, 2005a; Horton & Slaten, 2012). More research is also required to explore the different situational and dispositional influences upon audience design. It is via the continuation and accumulation of this research that a unified theory of audience design might emerge.

With the absence of a unified theory one issue that has plagued the audience design research literature has been an unclear definition of what audience design actually is, reflected by the existence of a number of related terms used to describe the same phenomenon (e.g., audience design, recipient design, considerate communication, convergence, among others). Complicating matters is that audience design is a phenomenon thought to be a fundamental aspect of communication and therefore is believed to occur (in varying levels) across all communication contexts that vary in regards to communication goals (e.g., being informative, making a good impression, maintaining a social identity, negotiation, conflict resolution, etc.), communication medium (e.g., face-to-face, text chat, email, etc.), communication topic (e.g., achieving a task-related joint goal, getting acquainted, gossip, conflict, etc.), and differences in communication
ability or characteristics of people engaged in the communication. The typical
definition of audience design in papers examining the phenomenon is simply to
state the very general (and arguably vague) definition as communication that is
produced by considering the perspective of the audience. An additional
contribution of this thesis has been to provide an example of how research can be
conducted in a way that makes it clearer to the reader precisely what
communicative behaviour is being examined. In Chapter 2 a number of different
communicative behaviours were defined, and analysed: perspective retention,
modification, reconceptualisation, shifting, and combination. It is recommended
that researchers interested in investigating audience design would benefit from
thinking about precisely what kind of communicative behaviour is the focus of the
investigation.

This thesis used a *single* methodological paradigm (referential
communication task). This paradigm was chosen because it has been one of the
most commonly used methodological paradigms in communication research in
the field of psychology. A version of a referential communication task was
conducted across all experiments in this thesis to keep the methodology similar
across the assessment of the different factors. However the benefit of
maintaining consistency throughout this thesis reduces the ability to generalise
results. This thesis has produced evidence suggesting that a number of factors
(level of interaction, majority influence, estimates of communicative effectiveness
and age) can influence audience design in the context of a *referential
communication task*. Further research is required in order to reproduce these
findings in a range of other communicative contexts, such as negotiation (Balliet,
2010; Galinsky et al., 2008; Galinsky & Mussweiler, 2001; Neale & Bazerman,
1983; Van Boven et al., 2003), conflict resolution (Heydenberk & Heydenberk,
2005), education (Chi et al., 2004; Kosba, Dimitrova, & Boyle, 2007; Skinner,
Campbell, Rimer, Curry, & Prochaska, 1999; Topping, 1996), expert-layperson
communication (Bromme, Jucks, & Runde, 2005; Nuckles et al., 2006; Nuckles et
al., 2005), impression management (Fleming, 1994; Fleming et al., 1990; Kraljic,
Samuel, & Brennan, 2008; Leary, Allen, & Terry, 2011), communicating
stereotypes (Kashima et al., 2010; Kashima, Lyons, & Clark, 2013; Lyons &
Kashima, 2001), and relationship building (Echterhoff, Higgins, & Groll, 2005;
Echterhoff et al., 2009; Higgins, 1992).

An underlying theme of the current thesis has been the distinction
between non-strategic egocentric models of communication and strategic
allocentric models of communication. The overall pattern of results in the experiments reported in this thesis support the contention of non-strategic models that egocentrism acts to inhibit audience design behaviour (Keysar, 2007). However in the final experiment (reported in Chapter 4) an underlying strategic appraisal process was found to be influencing communication choice that is consistent with strategic models (H. H. Clark, 1996; Horton, 2007). This strategic process was also found to be influenced by an egocentric bias to favour one’s own perspective over that of others. Therefore despite finding support for a strategic process, there was also support for a non-strategic egocentric bias impacting upon this process. Therefore whilst different communication models have different emphasis upon the importance and influence of egocentric and allocentric processes, this thesis provides evidence to suggest that a unified theory of audience design will need to adequately encompass the complex interaction of egocentric and allocentric processes that occur during human communication.
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Appendix 1. The set of tangrams used for all experiments reported in this thesis.