

**Medium Matters:**

**Signaling Social Power in the Age of Online Messaging**

By

Emily J. Siff

Brown University

Thesis

Submitted in partial fulfillment of the requirements for the Degree of Master of Science in the  
Department of Cognitive, Linguistics, & Psychological Sciences (CLPS)

PROVIDENCE, RHODE ISLAND

May 2020

This thesis by Emily J. Siff is accepted in its present form by the Department of Cognitive,  
Linguistics, & Psychological Sciences (CLPS) as satisfying the thesis requirements for the degree  
of Master of Science

Date April 10, 2020

Signature of Advisor  .

Typed Name of Advisor Dr. Steven Sloman

Approved by Graduate Council

**Date** \_\_\_\_\_

**Signature of Dean of the Graduate School** \_\_\_\_\_

**Typed Name of Dean of the Graduate School** \_\_\_\_\_

### Acknowledgements

Thank you to this lab's Principal Investigator (PI) and advisor, Dr. Elinor Amit.

Thank you to my advisor and teacher, Dr. Steven Sloman.

Thank you to my thesis committee:

Dr. Elinor Amit, Dr. Steven Sloman, & Dr. Roman Feiman.

Thank you to faculty who were not involved in this thesis in an official capacity and yet went above and beyond in providing support:

Dr. Gregory Elliott, Dr. Jack Wright, & Dr. Joachim Krueger.

Thank you to the Directors of Graduate Studies (DGS) of the Department of Cognitive, Linguistics, & Psychological Sciences (CLPS):

Dr. Dima Amso & Dr. David Badre.

Thank you to the Deputy Dean of the College, Dr. Christopher Dennis.

**Each of these faculty have my sincere gratitude. This thesis was written by one, but it was produced by many.**

## Table of Contents

<b>Abstract</b> .....	<b>2</b>
<b>Introduction</b> .....	<b>3</b>
<b>Background</b> .....	<b>6</b>
Image Use in The Age of Online Messaging .....	6
Social Power & Hierarchy .....	7
Why Images May Signal Lower Social Power .....	8
<b>Methods &amp; Results</b> .....	<b>11</b>
Study 1 .....	12
Study 2 .....	19
Study 3 .....	26
Study 4 .....	37
<b>Conclusion &amp; Discussion</b> .....	<b>48</b>
Conclusion .....	48
Discussion .....	49
<b>References</b> .....	<b>52</b>

**List of Figures**

**Figure 1 ..... 15**

**Figure 2 ..... 16**

**Figure 3 ..... 18**

**Figure 4 ..... 19**

**Figure 5 ..... 22**

**Figure 6 ..... 24**

**Figure 7 ..... 25**

**Figure 8 ..... 32**

**Figure 9 ..... 33**

**Figure 10 ..... 34**

**Figure 11 ..... 36**

**Figure 12 ..... 40**

**Figure 13 ..... 41**

**Figure 14 ..... 47**



# **Medium Matters:**

**Signaling Social Power in the Age of Online Messaging**



*Abstract of Medium Matters: Signaling Social Power in the Age of Online Messaging, by Emily J. Siff, Degree ScM., Brown University, May 2020.*

Our capacity to swiftly and easily send digital images is an advancement unique to the last decade. Facilitated by the rise of online messaging platforms (e.g. Facebook, iMessage), the exponential surge in online graphic use (e.g. photographs, emojis) raises the question: Do images convey different information than words? Research in two distinct fields – linguistic abstraction and social distance perception – strongly suggests that there is an unexplored link between the medium of a message (images versus words) and social power. Specifically, past research lends itself to the prediction that those in higher positions of power use images (versus words) less frequently than those in lower positions of power (e.g. Magee & Smith, 2013; Smith & Trope, 2006; Torrez et al., 2019). Via four online studies, we investigated this potential link between medium and social power. Studies 1 and 2 (Perception Studies) examined how the medium of a message affects the perceived power of another person. Studies 3 and 4 (Production Studies) examined how a person’s position of power affects which medium they choose to use in their messages. Across all studies, results consistently indicated that people can signal and infer social power from the medium of a message. With billions of people now using online messaging platforms that have digital image options, it is particularly critical to understand how the medium we use (images versus words) conveys our social power.

**Keywords:** power, signaling, perception, social distance, abstraction, social media, emoji

## Introduction

Over the course of the last decade, the use of online messaging platforms has skyrocketed (Hanson et al., 2010; Perrin, 2015; Twenge et al., 2019). Online messaging platforms include social media services, such as Facebook and Twitter, as well as instant messaging services, such as WhatsApp, Slack, and Apple's iMessage. In 2010, each online messaging platform had less than 6 million users. In striking contrast, by 2019, popular messaging platforms such as Facebook, WhatsApp, and iMessage engaged with billions of active users (Clement, 2020; for access to data tracking from 2002-2019, see Statista & TNW, 2019).

Messaging platforms enable fast, unprecedented forms of communication, including the use of online graphics. Online graphics are virtual images, such as photographs, emojis, and Graphics Interchange Formats (GIFs). The ubiquity and frequency of online graphic use is evident. For instance, from 2013 to 2015, over 10 billion emojis were sent on Twitter (Novak et al., 2015) and, by 2016, 92% of people who used messaging platforms used emojis (versus 0% in 2010, when emojis were not available on most platforms; for summary, see Emogi Research Team, 2016). The rise of messaging platforms and, with them, the use of online graphics raises the question: Do images convey different information than words?

Previous research indicates that the medium of a message (visual versus verbal representations)<sup>1</sup> can convey different information. For instance, images might add emotional information (Kaye et al., 2017) or signal closeness (Torrez et al., 2019). Within the specific context of digital communication, previous research has also demonstrated that images (e.g. emoticons) portray emotional or social intent (Derks et al., 2008; Kruger et al., 2005) and mitigate ambiguities that might arise during online interactions (Ganster et al., 2012). However, an uncharted consequence of the medium of our messages is their relationship with social power.

Online messaging platforms are often used as tools for social power. Global environmental movements carried out on Facebook, political statements sent via Twitter, and business connections maintained on LinkedIn are all examples of how messaging platforms can facilitate social power. In this age of online messaging and digital graphics, understanding whether the medium of our messages (visual versus verbal representations) signals information about our social power is critical. Building on two bodies of research, this paper suggests that there is a link between the medium of a message and social power.

There are two strong bases for hypothesizing that there is a link between medium and power. First, both verbal representations (versus visual representations) and higher (versus lower) social power have been connected to greater linguistic abstraction (e.g. Smith & Trope, 2006; Wakslak et al., 2014). Linguistic abstraction is defined as representing gist information while excluding incidental details (for overview, see Trope & Liberman, 2010). That both verbal representations and higher power are tied to greater abstraction lends itself to the prediction that those in higher

---

<sup>1</sup> When contrasting images and words, previous research has often referred to images as ‘visual representations’ and words as ‘verbal representations’ (e.g. Amit et al., 2009; 2013; Soderberg et al., 2015). Throughout this paper, we often use these terms as well.

positions of power will use less images than those in lower positions of power. Second, (a) lower-power individuals perceive the social distance between themselves and higher-power individuals to be less (than higher-power individuals do) (Lammers et al., 2012; Magee & Smith, 2013) and (b) greater social proximity invites greater image use (Torrez et al., 2019). This research also lends itself to the prediction that those in higher positions of power will use images less frequently than those in lower positions of power.

In short, previous research in both linguistic abstraction and social distance perception has strongly implied that there is a relationship between medium (images versus words) and social power. Building on these two bodies of research, we predicted that (i) people receiving a message would perceive the sender of that message to be in a higher (versus lower) position of power purely based upon the medium of the message (visual representations versus verbal representations)<sup>2</sup> and (ii) conversely, the medium that a message sender used (visual representations versus verbal representations) would be impacted by their position of power. Over the course of four online studies, we controlled for alternative explanations such as judgment, warmth, competence, age, and message content. Our findings consistently indicated that people can signal and infer social power purely based on the medium of a message.

---

<sup>2</sup> In all of our experiments, the verbal representation condition only included words ('Verbal-Only condition') while the visual representation condition included both images and words ('Visual+Verbal condition'). The logic behind making the visual representation condition comprised of both images and words was that, in our daily online communications, images are not often used in isolation; images generally supplement our words.

## **Background**

### **Image Use in The Age of Online Messaging**

The capacity to swiftly and easily send digital images is a unique feature of the last decade (Novak et al., 2015). For instance, the popular messaging service Apple IOS only added an emoji keyboard in 2011 and Android did not follow suit until 2013 (Pardes, 2018). These changes can be considered major catalysts in the rise of online graphic use. In the last decade, since emojis became a messaging option on popular platforms, emoji use has exponentially increased. Today, half of all posts on major social media platforms include emojis (Pardes, 2018; for overview, see Emogi Research Team, 2016).

In short, using images ('visual representations') in our daily communications is more viable than ever before. Via online graphics, people can easily opt to use images in their messages. Online graphics include photographs (pictures taken with a camera), emoticons (objects, emotions, and actions represented via the constraints of our standard keyboards), emojis (Unicode graphic symbols that represent objects, emotions, and actions), and GIFs (Graphics Interchange Formats; moving images on repeat) (Ganster et al., 2012; Miller et al., 2016; Tolins & Samermit, 2016).

As billions of people in the world are now engaging with online messaging platforms and graphics, examining the medium of a message (visual representations versus verbal representations) within online communication seems particularly salient. In this paper, we examine how sending images and words (versus only words) is linked to the perception and signaling of social power.

## **Social Power & Hierarchy**

Power is asymmetric control over valued resources: those in higher positions of power have more control over valued resources than those in lower positions of power (Magee & Galinsky, 2008; Thibaut & Kelley, 1959). Via both formal hierarchies (e.g. business positions, military, government) and informal hierarchies (e.g. family structures, seniority, popularity), power acts as a social force that structures and organizes individuals and groups (Galinsky et al., 2003; Rucker et al., 2014).

Hierarchy establishes social order, which is (a) psychologically appealing (in that hierarchy lends itself to the desire for stability) and (b) organizationally appealing (in that hierarchy effectively coordinates activity) (Frenkel-Brunswik, 1949; Magee & Galinsky, 2008; Neuberg & Newsom, 1993; Sorrentino & Roney, 1986). Moreover, by being comprised of disparate rankings, hierarchy incentivizes individuals to aim for a higher rank. This aim satisfies material self-interests and needs for control: as long as rank is determined by a performance dimension, all individuals within a hierarchy can seek to establish higher positions of power (Fiske & Berdahl 2007; Lammers et al., 2016; Pratto, 2015).

Critically, hierarchy can only function if both higher and lower positions of power are conveyed (signaled) and usefully interpreted (perceived) (Guinote, 2017; Schmid Mast, 2010). Rephrased, unless all positions of power are established, hierarchy cannot exist. Hence, although signaling higher power has benefits (Ridgeway et al., 1985; Smith & Galinsky, 2010), it stands to reason that, even when in lower positions of power, individuals still signal their power status (Magee & Galinsky, 2008). Notably, two conjunctive findings strongly imply that both lower and higher

power status signals are even conveyed subconsciously: (i) people can generally accurately identify their own and others' positions of power and yet (ii) people often *cannot* accurately determine which signals indicate these positions of power (Smith & Galinsky, 2010).

Signaling and understanding social power is so pivotal that, across species, there are clear behavioral, genetic, and neural underpinnings both for signaling one's own position of power and for interpreting others' positions of power (Smith & Hofmann, 2016; Koski et al., 2015; Chiao, 2010; Muscatell et al., 2012). Given the tools of communication uniquely available to humans (i.e. both visual and verbal representations), a critical question arises: can humans use these mediums of communication (images versus words) to signal and perceive positions of power?

### **Why Images May Signal Lower Social Power**

Via at least two avenues of research, past findings suggest that, in humans, there is a relationship between the medium of communication (images versus words) and social power.

***Linguistic Abstraction Rationale.*** The first rationale underlying the potential link between medium and social power is driven by a phenomenon known as linguistic abstraction. Both medium and social power are subject to linguistic abstraction.

In terms of medium, words (compared to images) are more abstract representations that exclude incidental details about the 'target' (for overview, see Trope & Liberman, 2010). For instance, the word 'suit' possesses less information than an image of a suit. An image of a suit (visual

representation) might show size, color, and other incidental details that the word ‘suit’ (verbal representation) is simply too abstract to represent.

In terms of social power, people placed in higher positions of power both communicate information more abstractly (Wakslak et al., 2014) and process information more abstractly (Huang et al., 2011; Magee et al., 2010; Smith & Trope, 2006; Stel et al., 2012).

In short, previous research has strongly tied both verbal representations (versus visual representations) and higher (versus lower) social power with greater linguistic abstraction. These findings lend themselves to the prediction that lower-power individuals use images more frequently than higher-power individuals.

***Social Distance Rationale.*** The second rationale underlying the potential link between medium and power is driven by the way in which both language and power interact with social distance. Social distance is the subjective experience of distance between the self and another (Magee & Galinsky, 2008). Those who are more socially distant from another person generally know less about that person’s life. Hence, for two socially distant individuals to successfully convey information, something is needed to create a shared reality between them. Words (versus images) are used to form these shared realities. In brief, although words are more abstract than images, words are also more precise: by excluding incidental details, verbal representations more precisely represent the gist of the information one is attempting to convey and, therefore, generate a shared reality between socially distant people (Amit et al., 2013).

For instance, sending someone who is socially distant an image of your new office will most likely be uninformative and confusing. In contrast, sending this socially distant person an email



that reads ‘I moved into a new office’ provides them with a more precise and informative message. On the other hand, someone who is socially proximal to you is more likely to already know that you are moving into a new office; you and this socially proximal person already have a shared reality. Hence, sending this socially proximal person an image of your new office provides them with more informative and concrete information (e.g. furnishings, personal items) than the sentence ‘I moved into my new office.’ Accordingly, past research has suggested that image use signals closeness (Torrez et al., 2019).

Importantly, previous findings have also consistently indicated that lower-power individuals perceive less social distance between themselves and those in higher positions of power (than higher-power individuals perceive between themselves and those in lower positions of power) (Lammers et al., 2012; Magee & Smith, 2013). This difference in the perception of social distance is most likely tied to the definition of power: asymmetric control over valued resources. By definition, the higher-power individual has more resources than the lower-power individual. This asymmetric control over resources leads to an asymmetric dependence on resources: the lower-power individual is more dependent upon the higher-power individual’s greater resources (than the higher-power individual is on the lower-power individual’s lesser resources). Consequently, an asymmetric experience of social distance arises: the higher-power person can remain socially distant while the lower-power person might be far more invested in maintaining the social relationship (Emerson, 1962; Fiske & Berdahl, 2007; Magee & Smith, 2013).

In short, as (a) lower-power individuals perceive the social distance between themselves and higher-power individuals to be less (than higher-power individuals do) and (b) greater social proximity invites greater image use (i.e. less need to create a shared reality), these findings easily

lend themselves to the prediction that higher-power individuals use images less frequently than lower-power individuals.

In sum, at least two substantial rationales – linguistic abstraction and social distance perception – lead us to the hypothesis that there is a link between the medium of communication (visual versus verbal representations) and social power. Hence, we hypothesized that a message solely comprised of words (versus comprised of both words and images) signals higher (versus lower) social power. Through two studies on power perception and two studies on power signaling, we present results strikingly consistent with this hypothesis. Accordingly, this paper proposes that the medium of our messages can signal social power.

## **Methods & Results**

### **Overview of Studies**

In the following studies, we examined the hypothesized link between medium and social power. Specifically, we examined how social power is perceived (Perception Studies) and signaled (Production Studies) in online communications. We predicted that **(i)** participants will perceive an individual who sends Verbal-Only (versus Visual+Verbal) messages as more (versus less) powerful and **(ii)** participants both primed for and naturally in higher (versus lower) positions of power will be more likely to use a greater proportion of verbal (versus visual) mediums of communication. Using between-subject designs, the Perception Studies (Studies 1 and 2) tested the first prediction while the Production Studies (Studies 3 and 4) tested the second prediction.

## Perception: Studies 1A-1C

Studies 1A-1C investigated the hypothesis that the medium of communication (visual versus verbal representations) is linked to perceived social power. Studies 1A-1C participants all read descriptions of drink products. These product descriptions were allegedly written by a ‘previous participant;’ in reality, these product statements were written by us (the researchers). Via a between-subject design with two conditions, half of the participants were shown product descriptions that only included words (Verbal-Only condition) while the other half of participants were shown product descriptions that included both words and images (Visual+Verbal condition). We predicted that participants in the Verbal-Only condition would perceive the ‘previous participant’ to be more powerful than participants in the Visual+Verbal condition perceived the ‘previous participant’ to be.

## Methods

### *Participants*

**Study 1A:** In exchange for monetary compensation, 142 Amazon Mechanical Turk (MTurk) participants completed an online survey. Participants who failed the task were excluded (N=3). Across all Perception Studies (1 & 2), ‘failing the task’ was defined as having zero variance throughout the entire experiment.<sup>3</sup> For Study 1A, with exclusions, N=139 (*Mage*=32.27[20,65]; *Female*=57, *Male*=82, *Other*=1).

---

<sup>3</sup> Concretely, zero variance meant that the participant clicked on the exact same button throughout the entire experiment. For consistency, we defined this as ‘failing the task’ throughout all relevant studies (Studies 1 & 2).

**Study 1B:** In exchange for monetary compensation, 159 Amazon Mechanical Turk (MTurk) participants completed an online survey. Participants who failed the task were excluded (N=6) and, additionally, participants who were familiar with the material were then excluded (N=11). This second exclusion criteria was applied to both Studies 1B and 1C, with the logic that participants might have completed one of the prior surveys (Studies 1A or 1B). For Study 1B, with exclusions, N=142 (*MAge*=35.04[19,67]; *Female*=61, *Male*=81).

**Study 1C:** In exchange for monetary compensation, 159 Amazon Mechanical Turk (MTurk) participants completed an online survey. Participants who failed the task were excluded (N=6) and, additionally, participants who were familiar with the material were then excluded (N=26). Exclusion parameters were stringently identical to those used in Study 1B. For Study 1C, with exclusions, N=127 (*Mage*=31.24[19,69]; *Female*=56, *Male*=71).

### *Stimuli & Procedure*

Across Studies 1A-1C, the stimuli were comprised of two sentences about ‘mojo juice,’ a fake drink product (paradigm adapted from Joshi & Wakslak, 2014). For each study, there were two between-subject conditions: a condition in which only words were used (Verbal-Only condition) and a condition in which both words and images were used (specifically, one emoji face was at the end of each sentence; Visual+Verbal condition). The sentences were allegedly composed by a ‘previous participant,’ but, in reality, the descriptions were written by us, the researchers. Across all three studies, the text size was 14, the text font was Calibri, and the emojis were retrieved from common messaging platforms (e.g. iMessage, WhatsApp). For Studies 1A-1C stimuli, see Figure 1.

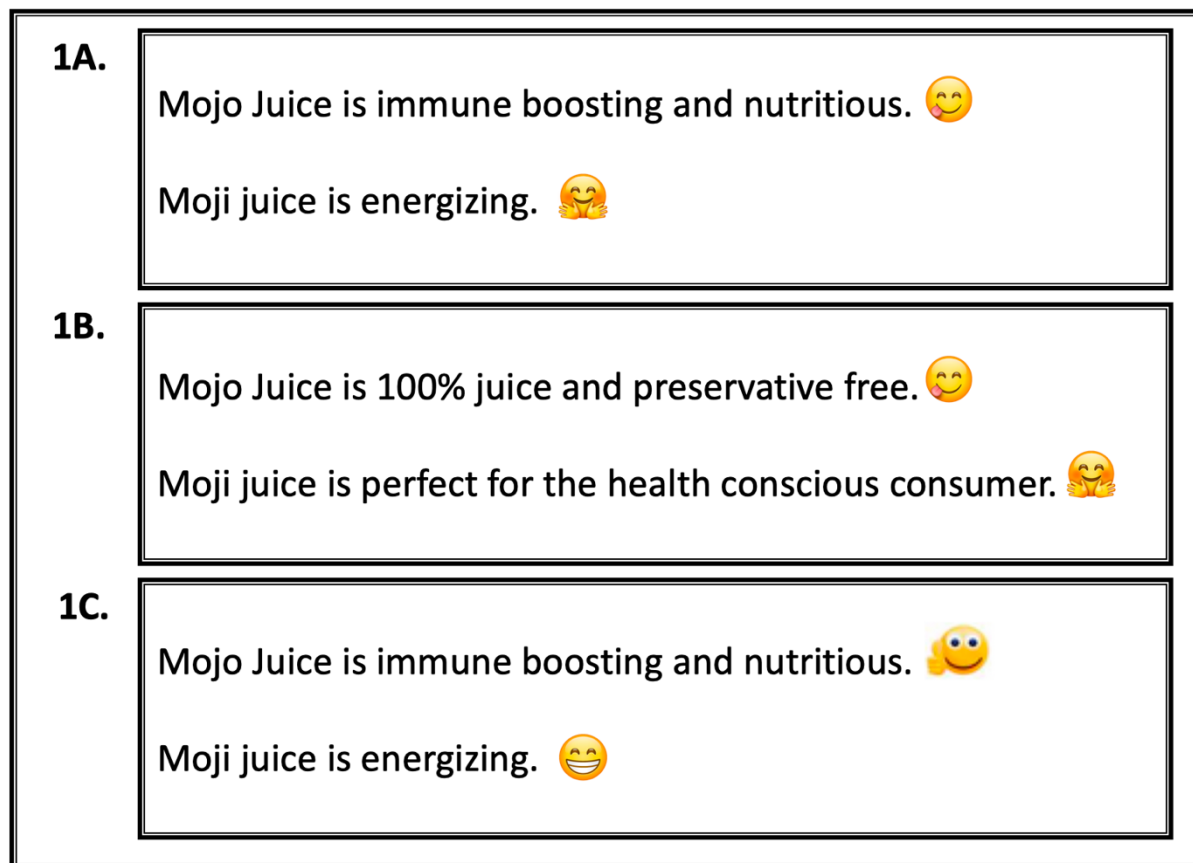
*In Study 1A*, the first line read “Mojo Juice is immune boosting and nutritious” and the second line read “Mojo juice is energizing.” Half of the participants saw these two sentences as shown (Verbal-Only condition) and the other half of the participants saw these two sentences with one emoji face at the end of each sentence (Visual+Verbal condition).

*In Study 1B*, the emojis (visual representations) were identical to those used in Study 1A, but the words in the sentences (verbal representations) were different. In Study 1B, the first line read “Mojo Juice is 100% juice and preservative free” and the second line read “Mojo juice is perfect for the health conscious consumer.” Half of the participants saw these two sentences as shown (Verbal-Only condition) and the other half of the participants saw these two sentences with one emoji face at the end of each sentence (Visual+Verbal condition).

*In Study 1C*, the emojis (visual representations) were different than those used in Studies 1A (and 1B), but the words in the sentences (verbal representations) were identical to those used in Study 1A. In Study 1C, the first line read “Mojo Juice is immune boosting and nutritious” and the second line read “Mojo juice is energizing.” Half of the participants saw these two sentences as shown (Verbal-Only condition) and the other half of the participants saw these two sentences with one emoji face at the end of each sentence (Visual+Verbal condition).

**In Studies 1A-1C**, after seeing the stimuli (Verbal-Only condition or Visual+Verbal condition), the participants were asked to rate the characteristics of the ‘previous participant’ on multiple dimensions (adapted from Wakslak et al., 2014). Dimensions were comprised of the degree of Power (Dominant, Powerful, In Control, Important), Warmth (Friendly, Trustworthy, Likeable), Competence (Knowledgeable, Competent, Intelligent), and Judgment (Judgmental, Critical, Opinionated). Ratings used a Likert Scale ranging from 1=‘Not At All’ to 7=‘Very Much’

(Figure 2). Subsequently, participants were asked if the ‘past participant’ would be better suited for a ‘worker’ or ‘manager’ role (7-point Likert Scale, from 1=‘worker’ to 7=‘manager’), with ‘manager’ (versus ‘worker’) acting as an additional proxy measure for higher power. Last, all participants were asked basic demographic questions (e.g. age, sex, familiarity with materials).



**Figure 1.** Stimuli from Studies 1A-1C. Half of the participants saw only the words (Verbal-Only condition) and the other half of the participants saw the words and the images (Visual+Verbal condition). In Study 1B, the images (emojis) used were the same as those used in Study 1A while

the words used were different. In Study 1C, the words used were the same as the words used in Study 1A while the images (emojis) were different.

		Not at all						Very much
		1	2	3	4	5	6	7
<b>Power</b>	Dominant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Powerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	In control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Warmth</b>	Friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Trustworthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Likeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Competence</b>	Knowledgeable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Competent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Intelligent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Judgement</b>	Judgmental	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Critical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Opinionated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure 2.** Measure of social power for Studies 1A-1C (as well as for Study 2). Participants were asked to rate the characteristics of the ‘previous participant’ on multiple dimensions (adapted from Wakslak et al., 2014). Dimensions were comprised of the degree of Power (Dominant, Powerful, In Control, Important), Warmth (Friendly, Trustworthy, Likeable), Competence (Knowledgeable, Competent, Intelligent), and Judgment (Judgmental, Critical, Opinionated). Ratings used a Likert Scale, ranging from 1=‘Not At All’ to 7=‘Very Much.’

## Results

The results for Studies 1A-1C are presented in Figures 3 and 4.

**Study 1A:** A one-way ANOVA revealed that participants in the Verbal-Only condition (versus Visual+Verbal condition) rated the ‘previous participant’ as significantly more (versus less) powerful ( $M_s = 4.795$  and  $4.323$ , respectively;  $F(1,137) = 4.200$ ,  $p = 0.042$ ,  $\eta_p^2 = 0.030$ ).

Additionally, participants in the Verbal-Only condition (versus Visual+Verbal condition) rated the ‘previous participant’ as more suitable for a manager (versus worker) position ( $M_s = 4.672$  and  $3.861$ , respectively;  $F(1,137) = 6.489$ ,  $p = 0.012$ ,  $\eta_p^2 = 0.045$ ). In Study 1A, the only dimension that was significant aside from Power and Manager/Worker was Judgment.

**Study 1B:** A one-way ANOVA revealed that participants in the Verbal-Only condition (versus Visual+Verbal condition) rated the ‘previous participant’ as significantly more (versus less) powerful ( $M_s = 4.438$  and  $4.395$ , respectively;  $F(1,140) = 4.987$ ,  $p = 0.027$ ,  $\eta_p^2 = 0.034$ ).

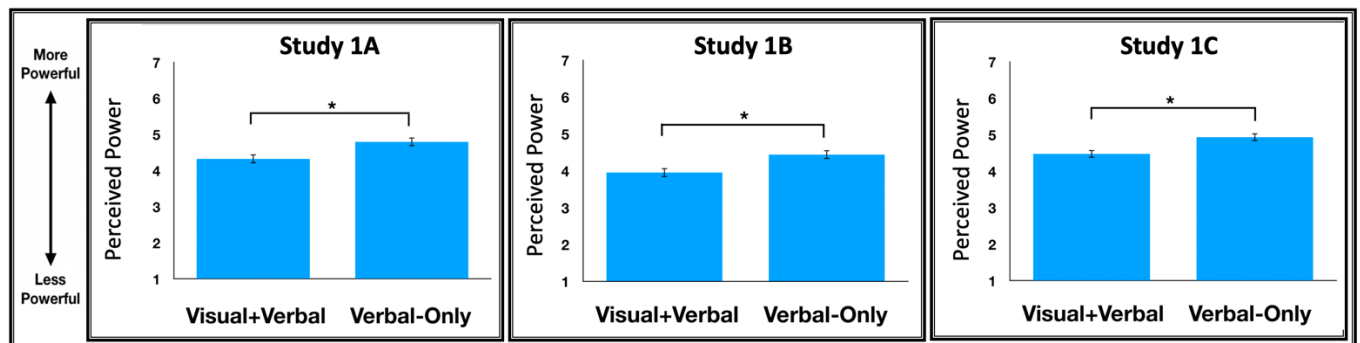
Additionally, participants in the Verbal-Only condition (versus Visual+Verbal condition) rated the ‘previous participant’ as more suitable for a manager (versus worker) position ( $M_s = 3.638$  and  $4.035$ , respectively;  $F(1,140) = 6.786$ ,  $p = 0.010$ ,  $\eta_p^2 = 0.046$ ). In Study 1B, the only dimension that was significant aside from Power and Manager/Worker was Judgment.

**Study 1C:** A one-way ANOVA revealed that participants in the Verbal-Only condition (versus Visual+Verbal condition) rated the ‘previous participant’ as significantly more (versus less) powerful ( $M_s = 4.931$  and  $4.472$ , respectively;  $F(1,125) = 5.229$ ,  $p = 0.024$ ,  $\eta_p^2 = 0.040$ ). In this iteration of the study, participants in the Verbal-Only condition (versus Visual+Verbal condition) did not rate the ‘previous participant’ as more suitable for a manager (versus worker) position

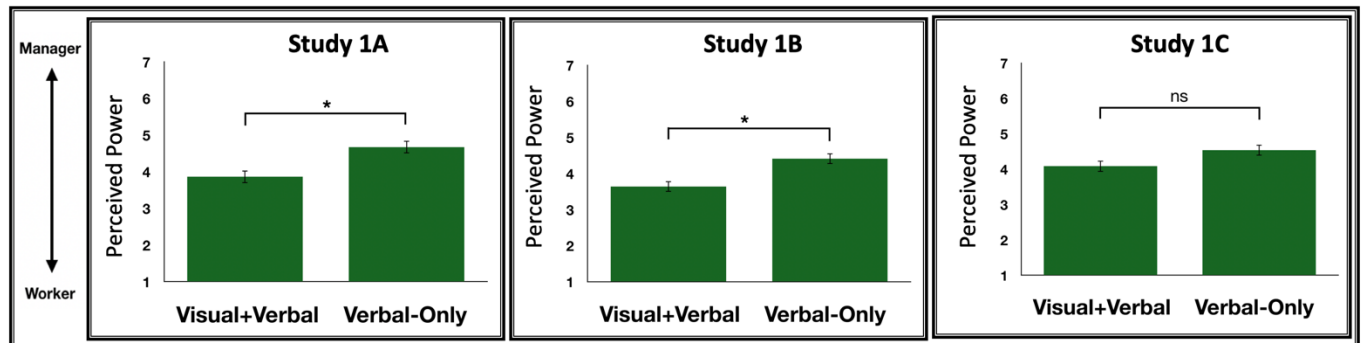


( $M_s = 4.538$  and  $4.081$ , respectively;  $F(1,125) = 2.184$ ,  $p = 0.142$ ,  $\eta_p^2 = 0.017$ ). The only dimension that was significant aside from Power was Warmth.

**Overview of Studies 1A-1C Results:** Relative to Study 1A, Study 1B used different words in the descriptions and Study 1C used different images (emoji faces) in the descriptions; hence, these studies varied in a way that controlled for any potential uniqueness inherent in the verbal and visual stimuli. Across all three studies, Power was the only dimension that was always significantly affected by the between-subject medium of communication (Verbal-Only condition versus Visual+Verbal condition). These findings are consistent with the prediction that visual (versus verbal) representations specifically influence people's perception of social power, as opposed to impacting people's perception of other factors such as warmth, competence, and judgment.



**Figure 3.** One-way between-subject ANOVA for effect of medium of communication (Visual+Verbal condition versus Verbal-Only condition) on Power in Studies 1A-1C. Note: \* indicates significance at  $\alpha = 0.05$ .



**Figure 4.** One-way between-subject ANOVA for effect of medium of communication (Visual+Verbal condition versus Verbal-Only condition) on manager (versus worker) role in Studies 1A-1C. Note: \* indicates significance at  $\alpha=0.05$  and ns is ‘not significant.’

### Perception: Study 2

The visual stimuli in Studies 1A-1C (Visual+Verbal conditions) were defined by emoji faces at the end of the verbal sentences. Study 2 examined whether the observed effect of medium on social power holds when, across conditions, **(i)** there are no faces, **(ii)** there is no additional information, and **(iii)** age assumptions are accounted for.

**(i)** An entire discipline of research has demonstrated that facial expressions can influence the perception of social power (e.g. Hareli et al., 2009). Therefore, so as not to confound the potential link between medium and social power, we avoided using faces in Study 2 as well as in all subsequent studies.

**(ii)** Regarding the additional information issue: in Studies 1A-1C, participants in the Visual+Verbal condition were presented with the exact same sentences as participants in the

Verbal-Only condition, except with emoji faces *added* at the end of each of the sentences. Thus, the following question arose: if we instead incorporate images into the sentence (i.e. images replace words instead of acting as additional information), does the previously observed effect of medium on social power remain?

(iii) Finally, a pressing and evident question is whether those in the Visual+Verbal condition (versus the Verbal-Only condition) perceived the message creator (the ‘previous participant’) to be younger because of the use of emojis (e.g. Gautam & Lalmuansangkimi, 2019). If lower age is assumed in one of the two conditions, age assumptions (instead of medium) might have driven the between-subject effects on social power seen in Studies 1A-1C. In short, since obtaining power often takes time, those who are younger are generally in lower positions of power.

In summary, Study 2 sought to examine the effect of medium on social power while addressing these three potential confounds.

## **Methods**

### *Participants*

In exchange for monetary compensation, 200 Amazon Mechanical Turk (MTurk) participants completed an online survey. Participants who failed the task were excluded (N=2). Across all Perception Studies (1 & 2), ‘failing the task’ was defined as having zero variance throughout the entire experiment. For Study 2, with exclusions, N=198 (*Age*=36.4[18,74]; *Female*=108, *Male*=89, *Other*=1).

### *Stimuli & Procedure*

All participants saw the following sentence: “Imagine you work at a large company. You received an invitation to the company's beginning of the year party. The email was written by Tom, who works in Human Resources at your company. You have never met him personally.” We specifically called Tom ‘him’ in order to control for gender assumptions.

Then, via a between-subject design with two conditions, half of the participants were randomly assigned to the Verbal-Only condition while the other half of the participants were randomly assigned to Visual+Verbal condition. All participants subsequently saw an invitation that read “There will be a beginning of the year toast on Tuesday! [Shrimp] and [champagne] will be served. Please RSVP if you are coming.” The only difference between conditions was that, for participants in the Visual+Verbal condition, two of the words (‘Shrimp’ and ‘champagne’) were replaced with corresponding emojis. To view the stimuli, see Figure 5.

After being presented with the party invitations (Verbal-Only condition or Visual+Verbal condition), all participants were asked to rate the characteristics of ‘Tom’ on multiple dimensions (adapted from Wakslak et al., 2014). Dimensions were comprised of the degree of Power (Dominant, Powerful, In Control, Important), Warmth (Friendly, Trustworthy, Likeable), Competence (Knowledgeable, Competent, Intelligent), and Judgment (Judgmental, Critical, Opinionated). Ratings used a Likert Scale, ranging from 1=‘Not At All’ to 7=‘Very Much’ (Figure 2).

After the dimension ratings, all participants completed a few irrelevant filler questions (e.g. “What wing of the building do you think Tom’s department (Human Resources) is in?,” with

multiple meaningless choice options of ‘North,’ ‘South,’ ‘East,’ ‘West’). These filler questions were presented in order to obscure the importance of the subsequent question, which was “What do you think Tom’s age is?” This is the question that we used to test and control for potential age assumptions. Age assumption options ranged from ages 18-99; these are the same age options we provided participants with in the demographics section. Last, all participants were asked basic demographic questions (e.g. age, sex).



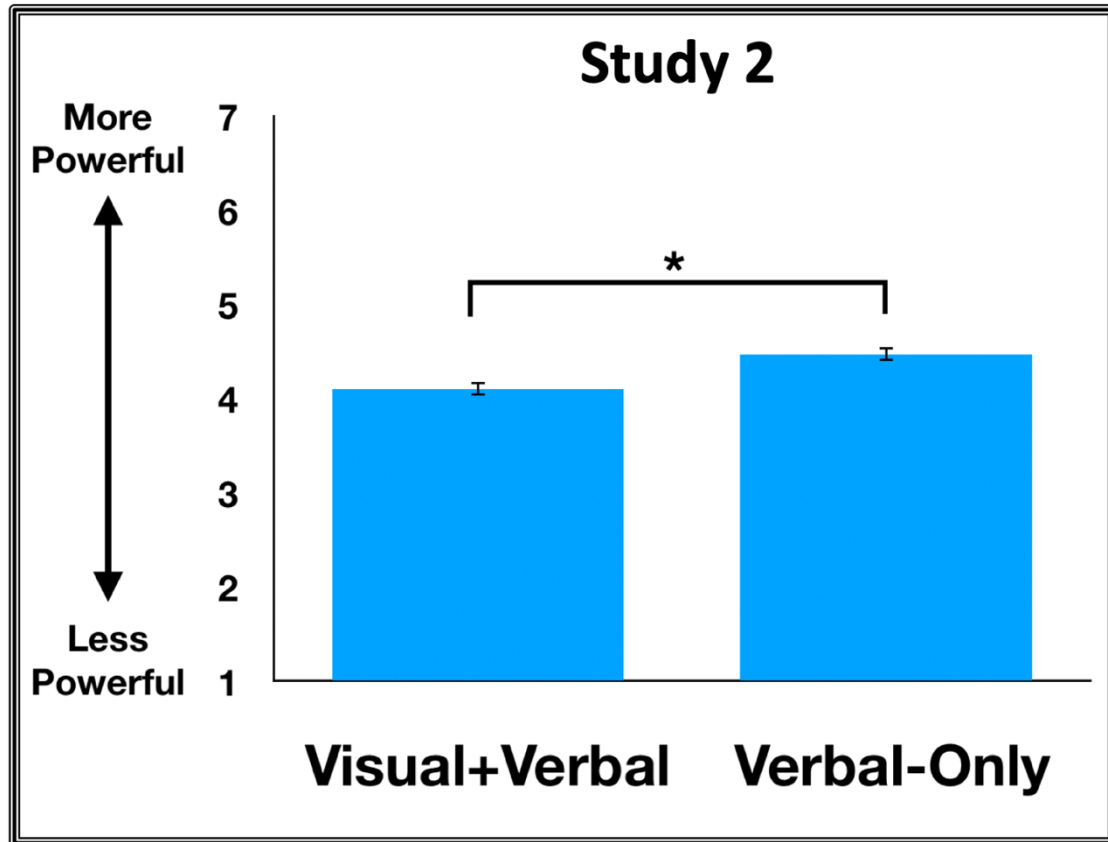
**Figure 5.** Stimuli of Study 2. Half of the participants saw only the words (Left; Verbal-Only condition) and the other half of the participants saw the words with images (emojis) replacing ‘shrimp’ and ‘champagne’ (Right; Visual+Verbal condition).

## Results

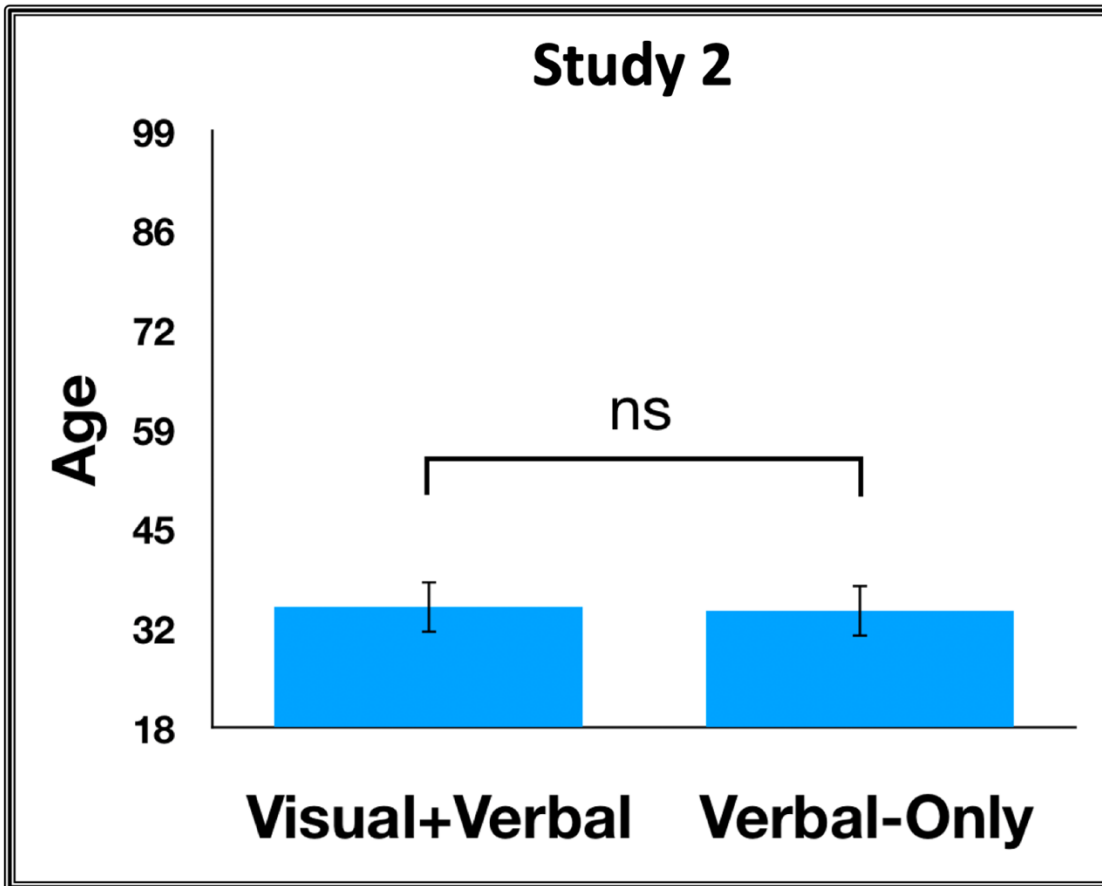
A one-way ANOVA revealed that participants in the Verbal-Only condition (versus Visual+Verbal condition) rated 'Tom' as significantly more (versus less) powerful ( $M_s = 4.472$  and  $4.102$ , respectively;  $F(1,196) = 4.584$ ,  $p = 0.034$ ,  $\eta_p^2 = 0.023$ ; Figure 6). Moreover, no other dimensions (Warmth, Competence, or Judgment) were significant.

Critically, the age that participants in the Verbal-Only condition estimated for 'Tom' did not significantly differ from the age that participants in the Visual+Verbal condition estimated ( $M_s = 33.90$  and  $34.36$ , respectively;  $F(1,196) = 0.188$ ,  $p = 0.665$ ,  $\eta_p^2 = 0.001$ ; Figure 7). Moreover, age and Power were not significantly correlated (at  $\alpha = 0.05$ ); therefore, running an ANCOVA was unproblematic. When an ANCOVA was run with age as the covariate, condition as the independent variable (Verbal-Only versus Visual+Verbal), and Power as the dependent variable, Power's significance only decreased slightly and effect size barely increased ( $F(2,195) = 2.952$ ,  $p = 0.055$ ,  $\eta_p^2 = 0.029$ ).

**Overview of Study 2 Results:** In this study, Power was the only dimension that was significantly impacted by the between-subject medium of communication (Verbal-Only condition versus Visual+Verbal condition). These findings are consistent with the hypothesis that the medium of a message (words versus images) specifically influences people's perception of social power, as opposed to medium or social power being affected by other factors, such as warmth, competence, judgment, additional information, or perceived age of the sender.



**Figure 6.** One-way between-subject ANOVA for effect of medium of communication (Visual+Verbal condition versus Verbal-Only condition) on Power in Study 2. Note: \* indicates significance at  $\alpha=0.05$ .



**Figure 7.** One-way between-subject ANOVA for effect of medium of communication (Visual+Verbal condition versus Verbal-Only condition) on age in Study 2. Note: ns is 'not significant.'



### **Production: Studies 3A, 3B**

The Perception Studies examined the effect of the medium of communication (images versus words) on social power. Now, via a series of Production Studies, we examined the effects of social power on the medium of communication. In short, by endeavoring to extend our power perception findings to power signaling, we hypothesized that the link between medium and social power is bidirectional.

**Study 3A** was run in a more real-world setting (versus Amazon Mechanical Turk). In this study, we straightforwardly investigated (a) whether there is an effect of social power on medium and (b) if the interaction between medium and power is significant in a more real-world environment.

**Study 3B** then generalized the effect of power on medium (observed in Study 3A) to another circumstance. Moreover, Study 3B controlled for two potential confounds by examining whether the effect of social power on medium held when (i) emojis were not used and (ii) color was not present. Until Study 3B, all Visual+Verbal conditions had colorful emojis (in the image) while all Verbal-Only conditions were solely comprised of black text. As (i) emojis might be familiar to participants and hold connotations (e.g. universal connotations; see Scherr et al., 2019) and (ii) in some circumstances, color has been shown to interact with social power (e.g. clothing; see Kodzoman, 2019), addressing these two potential confounds in Study 3B was crucial.

## Methods

### *Participants*

**Study 3A:** For no compensation, 82 Brown University students completed an online survey. Participants who failed the task were excluded (N=6). Across all relevant Production Studies (Studies 3A, 3B), ‘failing the task’ was defined as the participant failing to know which condition they were placed in (Higher Power condition or Lower Power condition). Recognition (or failure to recognize) the condition was determined via a straightforward manipulation check (see *Stimuli & Procedure*). If the participant did not know which Power condition they were randomly assigned to, there was no point in analyzing their subsequent decisions. For Study 3A, with exclusions, N=76 (*Mage*=19.24[18,26]; *Female*=40, *Male*=36).

**Study 3B:** In exchange for monetary compensation, 301 Amazon Mechanical Turk (MTurk) participants completed an online survey. Participants who failed the task were excluded (N=35). Exclusion parameters were stringently identical to those used in Study 3A. For Study 3B, with exclusions, N=266 (*Mage*=37.82[20,69]; *Female*=118, *Male*=146, *Other*=2).

### *Stimuli & Procedure*

**In Study 3A,** all participants saw the following statements:

“In this survey, we combined two unrelated tasks for convenience.

The first task concerns factors that affect reading comprehension. In this task, you will read two excerpts from articles and answer questions about them.

The second task concerns people's opinions about real-life events. Please carefully read the description and then answer the questions about it.”

Then, all participants saw the following statement:

“We will start with the first task. In this task you will read two excerpts from articles and answer questions about them.”

In this first task, all participants read ‘excerpts’ from two news articles allegedly written by reporters (in reality, written by us, the researchers). First, all participants read and answered questions about a filler article excerpt, meant to obscure the importance of the subsequent article. Then, via a between-subject design, half of the participants read an article excerpt titled ‘More Hierarchical Employer-Employee Relationships Improve Productivity’ (Higher Power condition) and the other half of the participants read an article excerpt titled ‘Less Hierarchical Employer-Employee Relationships Improve Productivity’ (Lower Power condition). Each article described why signaling more (Higher Power condition) or less (Lower Power condition) hierarchical relations has been shown to be more beneficial (Figure 8). In short, we primed participants to think that signaling either more power (Higher Power condition) or less power (Lower Power condition) would be beneficial.

Next, all participants answered the same questions about the Hierarchy articles, including a manipulation check that read: “To increase company performance, managers should establish a \_\_\_\_\_ hierarchical relationship with their employees” (with the answer choice options of ‘less’ and ‘more,’ in a randomized order). Participants in the Higher Power condition should have chosen ‘more’ and participants in the Lower Power condition should have chosen ‘less.’ Those

who failed this manipulation check were excluded, as this indicated that the participants did not know which condition they were assigned to.

Finally, all participants saw the following statement:

“Now you will complete the second task, in which you will read a description and then answer questions about it.”

The description was as follows:

“Imagine you're a manager who works at a large company. You have a new employee. You would like to invite the new employee to the company's beginning of the year party. From the following options, please put together an invite to send to your employee. “

All participants were then given the same (binary) options. To obscure the binary option that was important, there were irrelevant invitation options, such as “Choose a first sentence” (with the binary options of ‘There will be a toast to the beginning of the year on Tuesday!’ and ‘There will be a beginning of the year party on Tuesday!’). The important option was “Choose a description,” in which the binary options were ‘Shrimp and champagne will be served’ (Verbal-Only option) or that exact sentence but with ‘shrimp’ and ‘champagne’ as emojis (Visual+Verbal option) (Figure 9). In short, the dependent variable in this Production Study (Study 3A) was analogous to the assigned invitation conditions (independent variable) in the previous Perception Study (Study 2). Last, all participants were asked basic demographic questions (e.g. age, sex).

*In Study 3B*, all participants were told that they would be negotiating with another Amazon Mechanical Turk participant. In reality, this ‘other participant’ did not exist. Before the negotiation, all participants read about the best negotiating strategies. Importantly, half of the participants read that establishing higher power was more beneficial in a negotiation (Higher Power condition) while the other half of participants read that establishing lower power was more beneficial in a negotiation (Lower Power condition). Specifically, the between-subject manipulation was as follows:

“You will now participate in a negotiation with the MTurk participant you have been paired with (Player B). **Here is important information about your position in the negotiation:**

Research shows that when a negotiator believes the person they are bargaining with has a position of **higher [lower]** power, this throws the negotiator off guard and, consequently, the negotiator offers better deals.

Therefore, coming into this negotiation, you will benefit from making the other negotiator believe that you have a **more [less]** powerful position. Throughout the negotiation, do everything you can to establish this impression.”

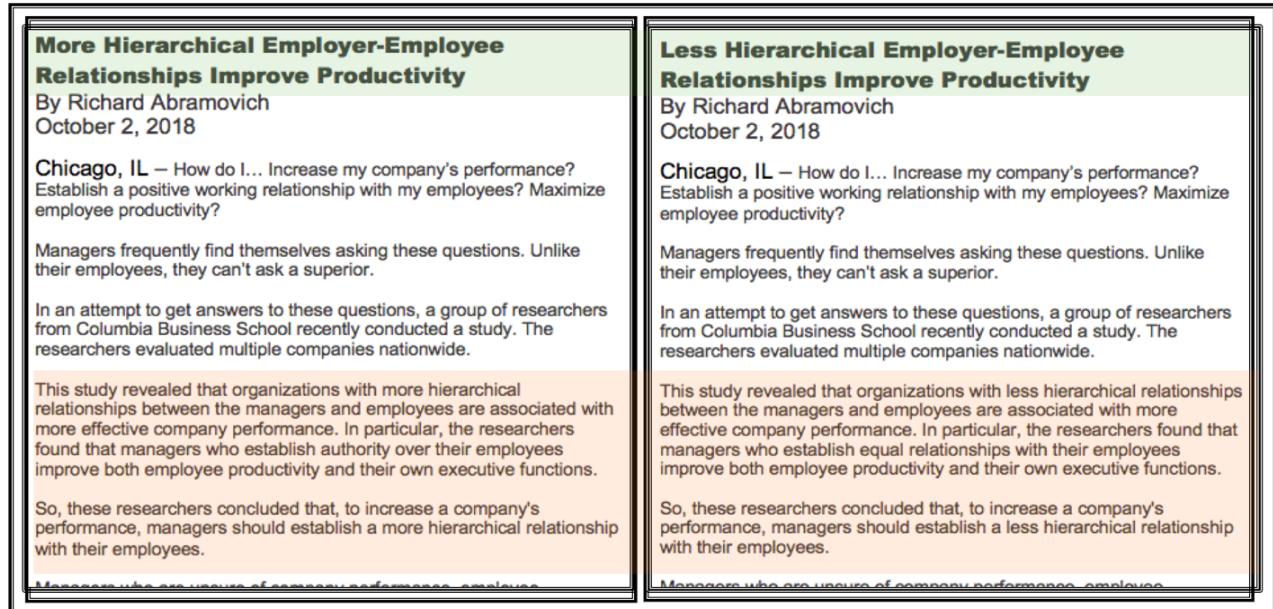
To reiterate, those in the Higher Power condition saw the words ‘higher power’ and ‘more powerful’ in the between-subject manipulation while those in the Lower Power condition saw the words ‘lower power’ and ‘less powerful’ in the between-subject manipulation. In short, analogous to Study 3A, in Study 3B we primed participants to think that signaling either higher power (Higher Power condition) or lower power (Lower Power condition) would be beneficial.

Next, all participants answered questions about the negotiation, including a manipulation check. The manipulation check for Study 1B was: “You are trying to establish the impression that you have a position of \_\_\_\_\_” (with the options ‘high power’ and ‘low power,’ in a randomized order). Participants in the Higher Power condition should have chosen ‘high power’ while participants in the Lower Power condition should have chosen ‘low power.’ Those who failed this manipulation check were excluded, as this indicated that the participants did not know which condition they were assigned to.

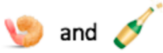
Then, all participants were asked the following question:

“You will now send Player B a message that indicates you are ready to begin the negotiation. From the following two options, which message would you like to send to Player B?”

All participants were given the binary options of ‘Let’s begin the negotiation’ (Verbal-Only option) or this exact sentence but with ‘negotiation’ as an image (a handshake; Visual+Verbal option) (Figure 10). Importantly, the image for ‘negotiation’ (i) was not an emoji and (ii) was in black (no color), thus controlling for (i) participants’ potential familiarity with or connotations regarding emojis and (ii) color differences between colorful images versus black-only text. Last, all participants were asked basic demographic questions (e.g. age, sex).



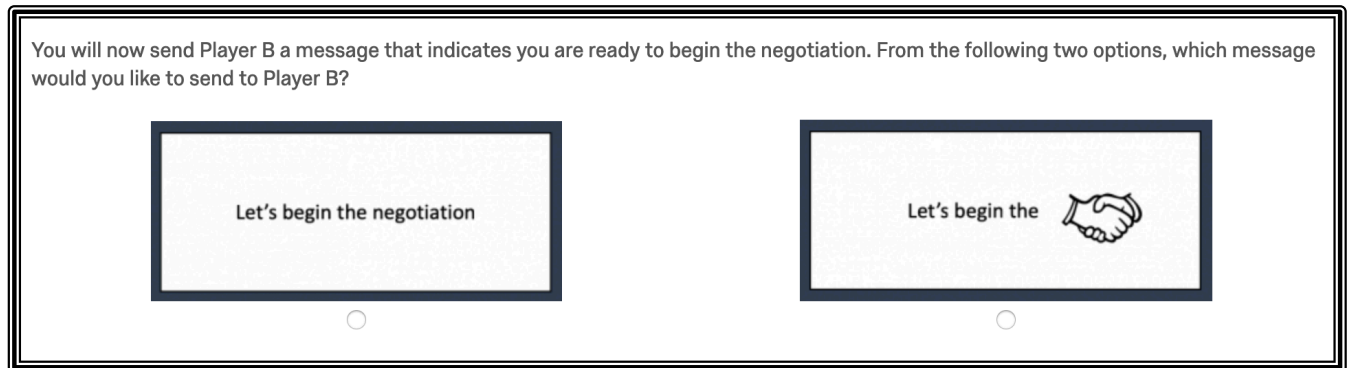
**Figure 8.** Stimuli for Study 3A. Half of the participants saw the article excerpt that encouraged establishing a more hierarchical employer-employee relationship (Left; Higher Power condition) and the other half of the participants saw the article excerpt that encouraged establishing a less hierarchical employer-employee relationship (Right; Lower Power condition).

<b>To obscure the DV</b>	<p>Choose a first sentence.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>There will be a toast to the beginning of the year on Tuesday!</p> <input type="radio"/> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>There will be a beginning of the year party on Tuesday!</p> <input type="radio"/> </div> </div>
<b>DV</b>	<p>Choose a description.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">  <p>and will be served.</p> <input type="radio"/> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Shrimp and champagne will be served.</p> <input type="radio"/> </div> </div>
<b>To obscure the DV</b>	<p>Choose a font type.</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Font Type A</p> <input type="radio"/> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Font Type B</p> <input type="radio"/> </div> </div>

**Figure 9.** Measure of medium of communication for Study 3A. DV is dependent variable. All participants were assigned to a ‘manager’ position and asked to build a work party invitation; however, as previously stated, half of participants were first told that establishing more hierarchical employer-employee relations was more beneficial (Higher Power condition) while the other half were first told that establishing less hierarchical employer-employee relations was more beneficial (Lower Power condition). All participants saw the same binary stimuli options. The relevant binary option (DV) says “Choose a description” and offers a Visual+Verbal option with corresponding images (emoji) in place of the words ‘shrimp’ and ‘champagne’ (Left) and a



Verbal-Only option with only words (Right). Between-subjects, the binary options were presented in a randomized order.



**Figure 10.** Measure of medium of communication for Study 3B. After half of the participants were told that establishing higher power is more beneficial in a negotiation (Higher Power condition) and the other half of the participants were told that establishing lower power is more beneficial in a negotiation (Lower Power condition), all participants were given these binary options to send to the ‘other participant’ they were negotiating with. One option is a Visual+Verbal sentence with an image of a handshake in place of the word ‘negotiation’ (Right) and the other option is a Verbal-Only sentence with only words (Left). Between-subjects, these binary options were presented in a randomized order.

## Results

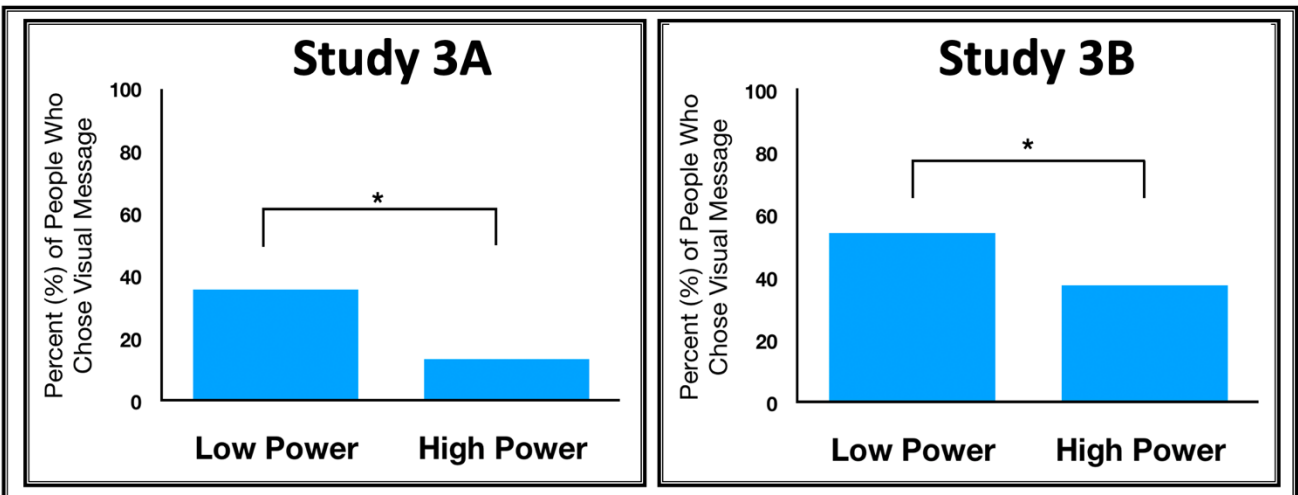
The results for Studies 3A & 3B are presented in Figure 11.

**Study 3A:** A Pearson Chi-Square Test of Independence revealed that participants in the Higher Power condition chose the Verbal-Only (versus Visual+Verbal) option significantly more frequently than participants in the Lower Power condition chose the Verbal-Only option. For ease of visualization, these statistics were computed into a difference of proportions ( $M_s = 13.0\%$  and  $35.9\%$  for Higher and Lower power, respectively;  $\chi^2(1, N=76) = 5.007, p = 0.0252, CI(95\%) = [2.8, 39.8]$ ).

**Study 3B:** A Pearson Chi-Square Test of Independence revealed that participants in the Higher Power condition chose the Verbal-Only (versus Visual+Verbal) option significantly more frequently than participants in the Lower Power condition chose the Verbal-Only option. For ease of visualization, these statistics were computed into a difference of proportions ( $M_s = 39.07\%$  and  $54.66\%$  for Higher and Lower power, respectively;  $\chi^2(1, N=266) = 7.41, p = 0.0065, CI(95\%) = [4.7, 28.1]$ ).

**Overview of Studies 3A & 3B Results:** In Study 3A, university students assigned to a high power position (e.g. a manager) were primed to signal either more power (Higher Power condition) or less power (Lower Power condition). Those in the Higher Power condition chose to send a Verbal-Only work message (versus a Visual+Verbal work message) significantly more frequently than those in the Lower Power condition. Analogously, in Study 3B, MTurk participants primed to signal higher power chose to send a Verbal-Only negotiation message (versus a Visual+Verbal negotiation message) significantly more frequently than participants

primed to signal lower power. In short, the results of these two studies were consistent with the prediction that signaling higher (versus lower) social power significantly affects the medium of communication participants use in their messages.



**Figure 11.** Comparison of proportions for the effect of power (Lower Power versus Higher Power) on medium of communication (percent of people who chose to use a Visual+Verbal message instead of a Verbal-Only message) for Studies 3A & 3B. Note: \* indicates significance at  $\alpha=0.05$ .

### **Production: Study 4**

By assigning positions of power through between-subject designs, the previous Production Studies (3A & 3B) examined the effect of social power on medium of communication. Study 4 thus sought to examine whether the effect of social power on medium of communication carries over into real-world workplace settings, in which positions of power are natural instead of assigned. In Study 4, we ran an international survey for clinicians (e.g. physicians, psychologists, EMTs) and observed whether clinicians' relative position of power in the workplace interacts with the number of images per messages that clinicians send (to other clinicians). We chose to study clinicians as both the message senders and the message receivers because, by necessity, clinical settings have well-established workplace hierarchies. We predicted that clinicians in relatively higher positions of power would send less images per messages (to other clinicians) than clinicians in relatively lower positions of power.

### **Methods**

#### *Participants*

For no compensation, 53 clinicians completed an online survey. 'Completion' was defined as completing the variable measurement questions (even if participants chose not to answer all demographic questions at the end). The participants in this study were recruited via Facebook groups, email lists, and clinically-relevant organizations. Of the 53 that completed the survey,

those that were not clinicians (N=7) were excluded. No other exclusions were used. The total number of participants was N=46 (*Age*=42.36[21,74<sup>4</sup>]; *Female*=31, *Male*=13, *Other*=2).

### *Stimuli & Procedure*

All participants saw the following statement:

“This is a survey for clinicians. In this survey, **a clinician is anyone who works with patients**, including nurses, physicians, researchers, therapists, psychiatrists, or psychologists. You do not need to have a degree, but you must work with patients.”

Then, all participants were asked:

“Do you work as a clinician in a hospital or clinic? Again, **a clinician is anyone who works with patients**, including nurses, physicians, researchers, therapists, psychiatrists, or psychologists.”

Those that chose ‘No, I do not work as a clinician’ (versus ‘Yes, I work as a clinician’) were excluded. Then, all participants saw the following statement:

“Please consider the most recent shift in which you messaged at least one coworker.

Please note: Group messages do NOT count -- please do not include them.

---

<sup>4</sup> We state that age 74 is the maximum age, but, technically, one of the 46 participants clicked on ‘99 years old.’ However, we strongly suspect that this was an accident, in that (a) this participant was not a robot: they passed the standard bot check and they provided detailed answers that only clinicians would know, such as stating that they used Epic’s messaging system when communicating with clinical coworkers and (b) this participant wrote that they had been an active surgeon for 20 years and that they were still surgically active.

Please look at your messages to the coworker you most recently messaged during that shift ('Coworker 1'). Importantly, please only consider coworkers who are clinicians.

We are now going to ask you a few brief questions about your relationship with Coworker 1.”

Then, all participants were asked to carry out the following task:

“An employee's position of power is where they are hierarchically, within an organization's structure. As a clinician, you communicate with other clinicians who hold positions that are superior to yours, inferior to yours, or similar to yours.

**Please rate Coworker 1's position of power in relation to your own.”**

Participants were shown a Likert Scale ranging from 1 to 7, with 1='Less Powerful Than Me,' 4='Equally Powerful To Me,' 7='More Powerful Than Me' (Figure 12). Hence, relative to the coworker they had messaged, a relatively higher power clinician would be rated, at most, as 1. A relatively lower power clinician would be rated, at most, as 7.

Next, participants were asked, “Throughout your shift, **how many messages** did you send to Coworker 1?” (discrete options: 0-49 messages), with messages including both words and images. Subsequently, participants were asked, “Throughout your shift, **how many images** did you send to Coworker 1 (photos, emoticons, emojis, or gifs)?” (discrete options: 0-49 images). For both number of messages sent (analogous to a Visual+Verbal variable) and number of images sent (analogous to a Visual-Only variable), clear examples were given of what does and

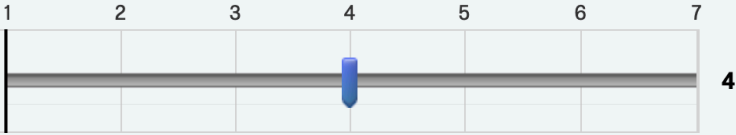
does not constitute a message and an image. For the message and image questions as well as their corresponding examples, see Figure 13.

Then, to control for closeness, the following question was asked: “Are you friends with Coworker 1? For example, outside of work hours, do you spend time with Coworker 1?” (7 point Likert Scale, from 1=‘Not Friends At All’ to 7=‘Close Friends’). Last, all participants were asked basic demographic questions (e.g. age, sex).

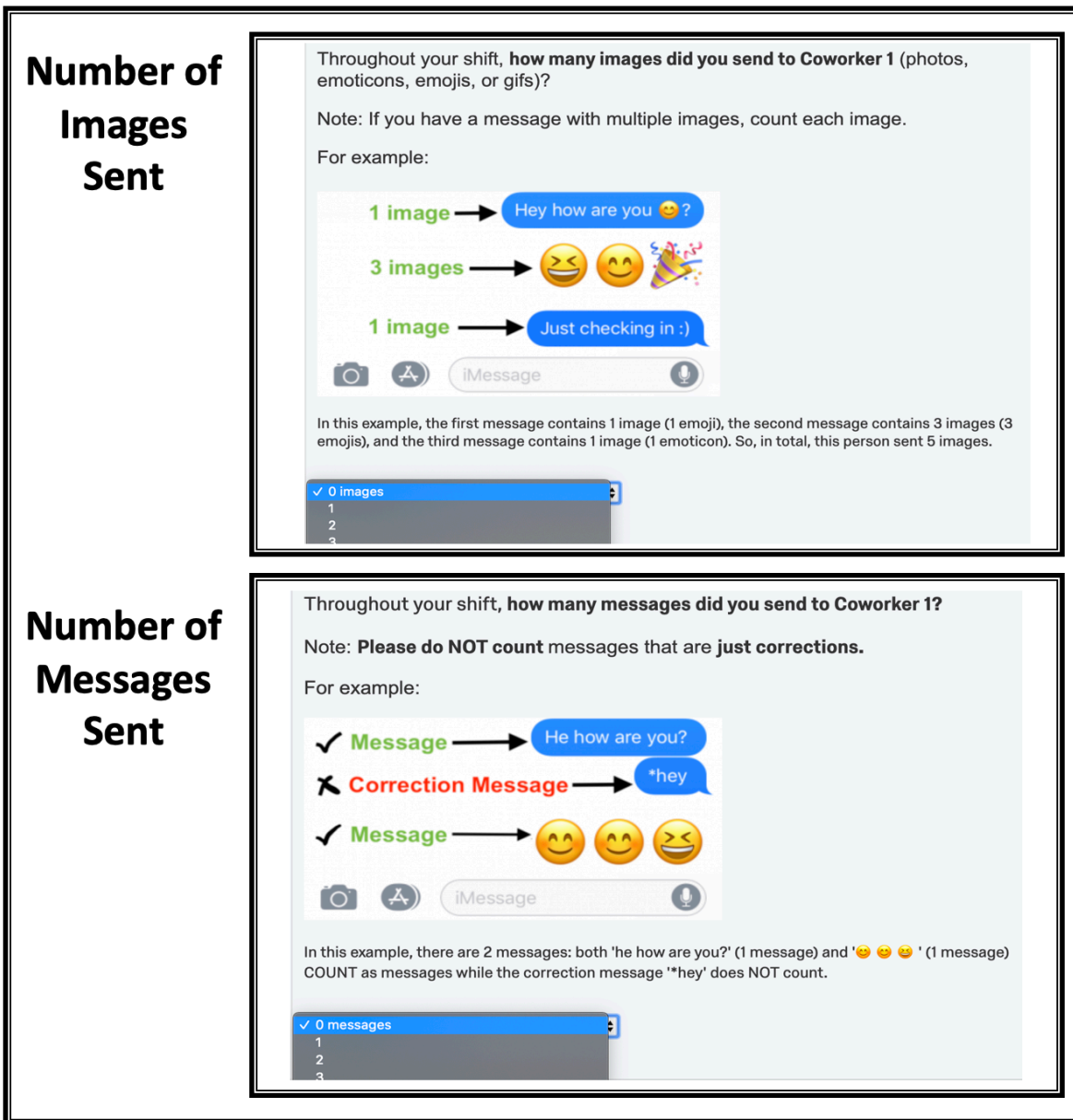
An employee's position of power is where they are hierarchically, within an organization's structure. As a clinician, you communicate with other clinicians who hold positions that are superior to yours, inferior to yours, or similar to yours.

**Please rate Coworker 1's position of power in relation to your own.**

<p>Less Powerful Than Me</p> <p>_____</p> <p>_____</p>	<p>Equally Powerful To Me</p> <p>_____</p> <p>_____</p>	<p>More Powerful Than Me</p> <p>_____</p> <p>_____</p>				
1	2	3	4	5	6	7



**Figure 12.** Measure of social power for Study 4. Participants were asked to rate their coworker’s position of power in relation to their own position of power, from 1=‘less powerful than me’ to 4=‘equally powerful to me’ to 7=‘more powerful than me.’ When this social power measure was discretized into a trichotomous variable, it was comprised of: High Power clinicians (defined as 1-3), Equal Power clinicians (defined as 4), and Low Power clinicians (defined as 5-7).



**Figure 13.** Measure of medium of communication for Study 4. Participants were asked how many images and messages they sent to their clinical coworker (over the course of their most recent shift). As shown in the figure, the conceptual and quantifiable definitions of ‘image’ and ‘message’ were clearly described. When the variable ‘number of images sent per number of messages sent’ was created, it was formed by taking the Number of Images Sent, adding a constant (1), and dividing this resulting value by the Number of Messages sent.



## Results

### *Coding the Main Explanatory & Outcome Variables*

**Explanatory Variable: Power.** In Study 4, the explanatory variable was the experienced power relation between the participant (the clinician sending the messages) and the participant's coworker (the clinician receiving the messages). As previously described, participants were shown a Likert Scale ranging from 1 to 7, with 1='Less Powerful Than Me,' 4='Equally Powerful To Me,' and 7='More Powerful Than Me' (Figure 12). Hence, in relation to the coworker they had messaged, a relatively higher power clinician would be rated, at most, as 1 while a relatively lower power clinician would be rated, at most, as 7. This continuous variable of Power was also discretized into a trichotomous variable, which was comprised of: Low Power clinicians (defined as 5-7; n=12), Equal Power clinicians (defined as 4; n=22), and High Power clinicians (defined as 1-3; n=12). Due to the drastic difference between trichotomous Power group sizes, harmonic means (which control for group size differences) were used (*Harmonic Mean<sub>sample size</sub>*=14.143; for Low, Equal, and High power: *Harmonic Means*=0.6688, 0.5572, 0.3878, respectively).

**Outcome Variable: Number of Images Sent per Number of Messages Sent.** The outcome variable in this study was the number of images sent per the number of messages sent. When this variable of 'Number of Images Sent per Number of Messages Sent' was created, it was formed by taking the number of images sent, adding a constant (1), and dividing this value by the number of messages sent (per participant). The reason that a constant was added to the numerator was because, while all participants sent some messages (denominator), some participants sent 0

images (numerator). If a constant had not been added to the numerator, all participants with 0 images sent would have  $\text{Number of Images Sent per Number of Messages Sent} = 0$ , despite that their denominators (Number of Messages) varied. Rephrased, without adding a constant to the numerator, there would have been a false floor effect of 0, thus hiding a range that was, in reality, more nuanced.

While adding a constant to the numerator is statistically uncontroversial, we understand that the creation of this outcome variable, in which we divided one outcome variable by another outcome variable, is potentially statistically controversial. Nonetheless, there are two important reasons that this mathematical decision was necessary.

First, in order to examine the effects of power on medium, we had to regress the number of images sent per the number of messages sent, not the number of images sent (visual representations) or, separately, the number of messages sent (verbal and visual representations). For instance, if a participant sent 5 images over the course of 20 messages, this would not be the same as a participant that sent 5 images over the course of 2 messages. The first participant evidently chose verbal representations more frequently while the second participant evidently chose visual representations more frequently. Without considering the ratio, it would seem that either both participants chose to use visual representations equally frequently (images sent) or it would be entirely unclear which participant chose to use visual representations more frequently (messages sent).

Second, a well-discussed solution for forming a ratio variable (taking the log of the numerator and the log of the denominator) was not possible. As previously mentioned, some participants sent 0 images;  $\log(0)=\text{undefined}$ . Moreover, some participants sent 1 message;  $\log(1)=0$  and any

number divided by 0 is undefined. Hence, taking the log of the numerator and the log of the denominator was not an option. Therefore, we used the pure ratio: Number of Images Sent per Number of Messages Sent.

### ***Omnibus & Pairwise Results for the Effect of Social Power on Medium***

Regressing Number of Images Sent per Number of Messages Sent on the continuous variable Power revealed no significance ( $F(1,44)=3.202, p=0.080$ ). However, the majority of participants rated their position of power (relative to their coworker) as entirely equal (Likert Scale rating=4). Hence, we predicted that there might a significant difference between clinicians in higher and lower (but not equal) positions of power. Consequently, we regressed Number of Messages Sent per Number of Images Sent on a trichotomous variable for Power (comprised of Low Power clinicians, Equal Power clinicians, and High Power clinicians) and then ran pairwise comparisons.

The omnibus ANOVA for Number of Images Sent per Number of Messages Sent on trichotomous Power was of course analogous to the continuous variable findings ( $F(1,44)=3.202, p=0.077$ ). However, the follow-up pairwise comparison (Tukey Honestly Significant Difference (HSD)) revealed that the difference between the High Power and Low Power groups (*Mean Diff.* = 0.281,  $p=0.067, CI(95\%) = [-0.0163, 0.5783]$ ) primarily and strongly drove the omnibus findings, *not* the difference between the High and Equal power groups (*Mean Diff.* = 0.169,  $p=0.268, CI(95\%) = [-0.0919, 0.4307]$ ) or the Low and Equal power groups (*Mean Diff.* = 0.112,  $p=0.558, CI(95\%) = [-0.1497, 0.3729]$ ).

This result is consistent with both (a) the statistical prediction that, specifically, the difference between the High and Low power groups drove the omnibus differences (of  $p=0.080$ ) and (b) the conceptual prediction that using more/less images per messages is particular to signaling lower/higher (versus equal) social power. For the trichotomous Power results, see Figure 14.

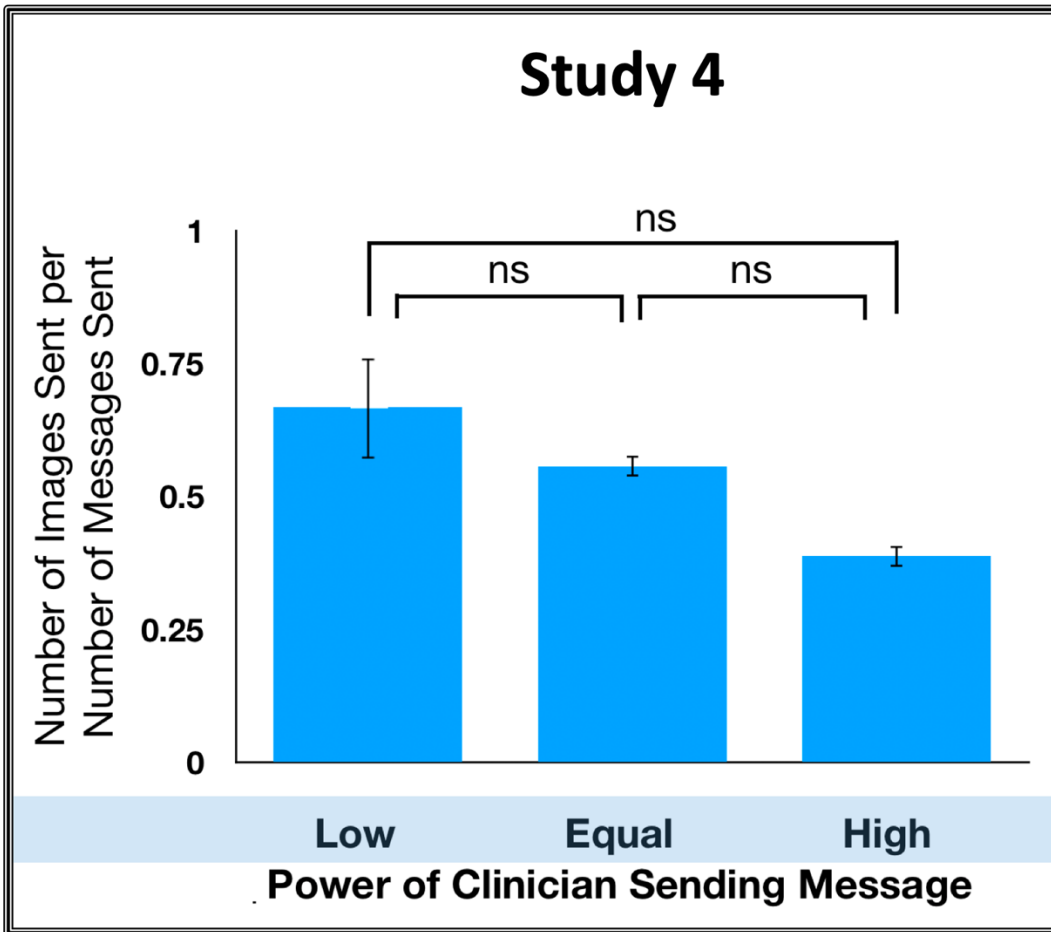
### ***Moderation Results for the Effect of Social Power on Medium***

As previously described, Magee and Smith (2013) proposed that lower-power individuals perceive the social distance between themselves and higher-power individuals to be less (than higher-power individuals do). Hence, a dimension that was important to measure was how close a clinician felt they were to the clinical coworker they sent messages to ('Closeness'). To reiterate, closeness was straightforwardly measured via the question "How close are you to the coworker you messaged?," with participants shown a Likert Scale ranging from 1 to 7 (1='Not Close At All,' 7='Extremely Close').

Through Hayes's moderation analysis (Hayes, 2013), we examined whether Closeness moderated the effect of Number of Images Sent per Number of Messages Sent on the continuous variable Power. Closeness was positively correlated with Power ( $R^2=0.236$ ; lower power, greater perceived closeness) and acted as a highly significant moderator ( $F(3,42)=4.315, p=0.0097$ ). Specifically, the interaction between the continuous Power variable and Closeness was significant when the clinician perceived themselves to be closer to the coworker they messaged (when  $Closeness=6.48, p=0.016$ ; when  $Closeness=4, p=0.033$ ) rather than when the clinician perceived themselves to be more distant to the coworker they messaged (when  $Closeness=1, p=0.414$ ).

These findings imply that, at each level of social power, greater perceived closeness resulted in more images per messages sent. Hence, consistent with Magee and Smith's 2013 proposal, Study 4 found that those in lower positions of power perceived themselves to be closer to those in higher positions of power (than those in higher positions of power perceived themselves to be to those in lower positions of power) and that this closeness perception moderated the greater amount of images (per messages) that lower-power individuals sent.

**Overview of Study 4 Results:** Regressing the variable Number of Images Sent per Number of Messages Sent on the continuous variable Power ( $F(1,44)=3.202, p=0.080$ ) and, similarly, on the trichotomous variable Power ( $F(1,44)=3.202, p=0.077$ ) revealed no significance. However, consistent with our prediction that signaling higher (versus lower) social power affects the medium of communication used (images versus words), a pairwise comparison between the trichotomous Power variables (High, Equal, & Low power) revealed that the difference between the High and Low power clinicians (not the Equal power clinicians) strongly drove the omnibus difference (*Mean Diff. for High & Low Power*=0.281,  $p=0.067$ ,  $CI(95\%)= [-0.0163, 0.5783]$ ). Moreover, when perceived closeness (between the clinician sending the message and the clinician receiving the message) was incorporated into the analysis, results revealed that (a) as previously predicted, those in higher positions of power perceived themselves to be less close to those in lower positions of power (than vice versa) and (b) closeness significantly moderated the relationship between social power and medium of communication ( $F(3,42)=4.315, p=0.0097$ ).



**Figure 14.** Study 4 pairwise comparisons of medium of communication (variable: Number of Images Sent per Number of Messages Sent) regressed on relative social power (trichotomous variable: Low, Equal, High). As visually shown, although there was no significance, the omnibus difference was driven by a strong pairwise difference between the Low and High power groups, not the pairwise differences between the Low and Equal or the High and Equal power groups.

Note: ns is 'not significant.'

## Conclusion & Discussion

### Conclusion

Accompanying the rise of online messaging platforms, the option to send digital images is now a prevalent facet of our lives. Hence, understanding whether the medium of our messages (images versus words) conveys different information is critical. In this paper, we hypothesized that medium can signal social power.

Drawing on two distinct fields of research — linguistic abstraction and social distance perception — we hypothesized that lower social power would be tied to using more visual (versus verbal) representations. Consequently, we predicted that (i) participants would perceive message senders who used both images and words (versus only words) to be in lower (versus higher) positions of power and (ii) participants in lower (versus higher) positions of power would use more images in their communications. We found results strikingly consistent with these predictions.

Via between-subject designs, participants consistently perceived those who used both words and images (versus only words) to be in lower positions of power (Studies 1A-1C, Study 2).

Conversely, both when participants were primed to signal lower social power (via between-subject designs; Studies 3A, 3B) and when participants were naturally in lower positions of power (Study 4), participants in positions of lower power consistently used words and images (versus only words) more frequently than participants in positions of higher power. In short, from studies that utilized between-subject priming to studies that took advantage of real-world

scenarios, our results consistently indicated that both the perception of and the signaling of less (versus more) social power is tied to using more visual representations.

## Discussion

From this paper's findings, at least four important future avenues arise.

**Developmental Factors.** One avenue to pursue is how developmental factors may underlie the relationship between social power and medium. Language develops with age; consequently, infants and young children typically use visually-based messages to communicate and understand others' attempts to communicate (e.g. smiling, waving hands) (Miller & Gildea, 1987; Corsini et al., 2013). As children are less powerful than adults both legally (e.g. Hamilton, 2016) and cognitively (e.g. Shaw et al., 2006), visual communication may be associated with less social power (while, in contrast, verbal communication may be associated with more social power). Although our studies controlled for the perceived age of the message sender (Study 2), we did not specifically examine a link between younger ages, visual representations, and social power. Pursuing this line of inquiry is a worthwhile undertaking for future studies.

**Social Factors.** Another avenue to pursue is how social factors such as gender interact with the relationship between power and medium. In Study 2, we endeavored to control for gender by specifying that the message sender was a 'him.' However, this method simply avoids addressing the question of how gender impacts the observed statistical relationship between power and medium. Notably, in most countries, women predominantly hold lower positions of power than men (for reference, see The Global Gender Gap Report, 2018) and, interestingly, researchers have consistently found that women use emojis at a frequency that far surpasses men (Prada et



al., 2018; Chen et al., 2018). For instance, in a recent study that examined 183 countries and 401 million messages, women used emojis significantly more frequently than men – not only in a statistical sense but also at a rate so drastically different that a machine learning algorithm could predict gender solely based on frequency of emoji use (81.1% accuracy; Chen et al., 2018). Hence, as women generally hold lower positions of power than men and women use digital images (e.g. emojis) with far greater frequency than men, gender is a potential moderator of the significant relationship between visual means of communication and lower social power. In essence, historically long-standing and global gender disparities might inform the link between social power and the medium of our communications.

**Formality.** Another valuable avenue to pursue is how formality interacts with social power and the medium of the message. Our studies focused on formal relations: each between-subject experiment (Studies 1-3) focused on formal workplace settings while the real-world study (Study 4) solely asked about coworker relations. The purpose of focusing on formal workplace settings was to (a) ensure that positions of social power were clearly defined and (b) to control for friendship, an informality that might render positions of power irrelevant (and, therefore, render image use irrelevant). However, it is possible that, within Perception Studies 1 and 2, participants in the Visual+Verbal conditions (versus Verbal-Only conditions) inferred lack of formality due to some inherent casualness that using images in a message entails. A potential counter to this claim is that, in Production Studies 3A and 3B, while formality was held constant across between-subject conditions, participants primed to signal less (versus more) power still significantly chose to use images and words (versus solely using words). Nevertheless, our future

studies have begun to more directly account for formality. When examining power relations, we encourage other researchers to consider formality as well.

***Social Distance Perception.*** Finally, a critical avenue to consider is how social distance (i.e. perceived closeness) affects the relationship between social power and medium. At the beginning of this paper, in hypothesizing that there was a link between power and medium, social distance perception was one of our primary rationales. Subsequently, Study 4's results suggested that the perception of dyadic social distance (closeness) is a moderator underlying the link between social power and message medium. Specifically, Study 4's findings indicated that (a) lower social power is tied to greater image use (correlational; regression results were not significant), (b) closeness is a significant moderator for the relationship between social power and message medium (images per messages), and (c) those in lower positions of power perceive themselves to be closer to those in higher positions of power (than vice versa). These closeness results are thus highly consistent with (i) Magee and Smith's proposal (2013) that lower-power individuals perceive the social distance between themselves and higher-power individuals to be less (than higher-power individuals do) and (ii) our rationale that social distance perception relates to (or even determines) the link between social power and image use. Our findings' consistency with these proposals is an incentive for future researchers to build on how closeness interacts with social power and the medium of our messages.

***Concluding Remark.*** As our communications become increasingly grounded in online messaging platforms and digital image use, the question of which signals we are sending – accidentally or not – is crucial. How social power is signaled purely from the medium of our messages (images versus words) is an inquiry that this paper's studies have begun to carefully

examine. Delving further into the link between social power and medium, our Discussion section actively points future researchers toward fresh avenues to pursue.

## References

- Amit, E., Algom, D., Trope, Y. (2009). Distance-dependent processing of pictures and words. *Journal of Experimental Psychology: General*, 138, 400–415.
- Amit, E., Wakslak, C., Trope, Y. (2013). How do we communicate with other people? The effect of psychological distance on preference for pictorial and verbal means of communication. *Personality and Social Psychology Bulletin*, 39(1), 43–56.
- Chen, Z., Lu, X., Ai, W., Li, H., Mei, Q., Liu, X. (2018). Through a Gender Lens: Learning Usage Patterns of Emojis from Large-Scale Android Users. *In WWW 2018: The 2018 Web Conference, April 23–27, 2018, Lyon, France*. ACM, New York, NY, USA, 763–772. Retrieved from <https://doi.org/10.1145/3178876.3186157>
- Chiao, J.Y. (2010). Neural basis of social status hierarchy across species. *Current Opinion in Neurobiology*, 20, 803-809.
- Clement, J. (2020, April 1). *Number of social network users worldwide from 2010 to 2023*. Statista. Retrieved from <https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>
- Corsini, N., Slater, A., Harrison, A., Cooke, L., Cox, D.N. (2013). Rewards can be used effectively with repeated exposure to increase liking of vegetables in 4-6-year-old children. *Public Health Nutr.*, 16(5), 942-951.
- Derks, D., Bos, A. E.R., von Grumbkow, J. (2008). Emoticons in computer mediated communication: social motives and social contexts. *Cyberpsychology & Behavior*, 11(1), 99e101.
- Emerson, R.M. (1962). Power-Dependence Relations. *American Sociological Review*, 27(1), 31-41.
- Emogi Research Team. (2016, November 16). *2016 Emoji Report*. Emogi. Retrieved from [https://cdn.emogi.com/docs/reports/2016\\_emoji\\_report.pdf](https://cdn.emogi.com/docs/reports/2016_emoji_report.pdf)
- Fiske, S. T., & Berdahl, J. (2007). Social power. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (p. 678–692). The Guilford Press.
- Frenkel-Brunswik, E. (1949), Intolerance Of Ambiguity As An Emotional And Perceptual Personality Variable. *Journal of personality*, 18, 108-143.

- Ganster, T., Eimler, S. C., & Kramer, N. C. (2012). Same same but different!? The differential influence of smilies and emoticons on person perception. *Cyberpsychology, Behaviour, and Social Networking*, 15(4), 226e230.
- Gautam, A., Lalmuansangkimi, C. (2019). Imaging connotation of emojis on communication and message perception. *International Journal of Engineering Applied Sciences and Technology*, 3(12), 50-58.
- Guinote, A. (2017). How Power Affects People: Activating, Wanting, and Goal Seeking. *Annual Review of Psychology*, 68, 353-381.
- Hamilton, V.E.. (2016). Adulthood in Law and Culture. *Faculty Publications*, 1824. Retrieved from <https://scholarship.law.wm.edu/facpubs/1824>
- Hanson, T. L., Drumheller, K., Mallard, J., McKee, C., Schlegel, P. (2010). Cell phones, text messaging, and Facebook: Competing time demands of today's college students. *College Teaching*, 59, 23–30.
- Hareli, S., Shomrat, N., Hess, U. (2009). Emotional versus neutral expressions and perceptions of social dominance and submissiveness. *Emotion*, 9(3), 378–384.
- Hayes, A.F. (2013). *Methodology in the social sciences. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
- Huang, L., Galinsky, A.D., Gruenfeld, D.H., Guillory, L.E. (2011). Powerful postures versus powerful roles which is the proximate correlate of thought and behavior?. *Psychological Science*, 22, 95–102.
- Joshi, P.D., Wakslak, C.J. (2014). Communicating with the crowd: Speakers use abstract messages when addressing larger audiences. *Journal of Experimental Psychology: General*, 143(1), 351–362.
- Kaye, L.K., Malone, S., Wall, H. (2017). Emojis: Insights, Affordances and Possibilities for Psychological Science. *Trends in Cognitive Sciences*, 21(2), 66-68.
- Kodzoman, D. (2019). The Psychology of Clothing: Meaning of Colors, Body Image and Gender Expression in Fashion. *Textile & Leather Review*. DOI: 10.31881/TLR.2019.22.
- Koski, J. E., Xie, H., Olson, I. R. (2015). Understanding social hierarchies: The neural and psychological foundations of status perception. *Social neuroscience*, 10(5), 527–550.
- Kruger, J., Epley, N., Parker, J., Ng, Z. (2005). Egocentrism over email: can we communicate as well as we think? *Journal of Personality and Social Psychology*, 89(6), 925e936.
- Lammers, J., Galinsky, A.D., Gordijn, E. H., Otten, S. (2012). Power increases social distance. *Social Psychological and Personality Science*, 3, 282–290.
- Lammers, J., Stoker, J.I., Rink, F., Galinsky, A.D. (2016). To Have Control Over or to Be Free From Others? The Desire for Power Reflects a Need for Autonomy. *Personality and Social Psychology Bulletin*, 42(4), 498-512.
- Magee, J. C., Smith, P.K. (2013). The social distance theory of power. *Personality and Social Psychology Review*, 17, 158–186.
- Magee, J.C., Galinsky, A.D. (2008). The self-reinforcing nature of power and status. *The Academy of Management Annals*, 2(1), 351.

- Magee, J.C., Milliken, F.J., Lurie, A.R. (2010). Power Differences in the Construal of a Crisis: The Immediate Aftermath of September 11, 2001. *Personality and Social Psychology Bulletin*, 36(3), 354-370.
- Miller, G.A., Gildea, P.M. (1987). How children learn words. *Scientific American*, 257(3), 94–99.
- Miller, H., Thebault-Spieker, J., Chang, S., Johnson, I., Terveen, L., Hecht, B. (2016). “Blissfully happy” or “ready to fight”: Varying interpretations of emoji. *Tenth international AAAI conference on Web and social media*.
- Muscattell, K.A., Morelli, S.A., Falk, E.B., Way, B.M., Pfeifer, J.H., Galinsky, A.D., Lieberman, M.D., Dapretto, M., Eisenberger, N.I. (2012). Social status modulates neural activity in the mentalizing network. *Neuroimage*, 60, 1771-1777.
- Neuberg, S.L., Newsom, J.T. (1993). Personal need for structure: Individual differences in the desire for simpler structure. *Journal of Personality and Social Psychology*, 65(1), 113–131.
- Novak, P.K., Smailović, J., Sluban, B., Mozetič, I. (2015). Sentiment of Emojis. *PloS one*, 10(12), e0144296.
- Pardes, A. (2018, February 1). *The WIRED Guide to Emoji*. Wired. Retrieved from <https://www.wired.com/story/guide-emoji/>
- Perrin, A. (2015, October). *Social networking usage: 2005–2015*. Washington D.C: Pew Research Center. Retrieved from <http://www.pewinternet.org/2015/10/08/2015/Social-Networking-Usage-2005-2015/>
- Prada, M., Rodrigues, D.L., Garrido, M.V., Lopes, D., Cavalheiro, B., Gaspar, R. (2018). Motives, frequency and attitudes toward emoji and emoticon use. *Telematics and Informatics*, 35(7), 1925-1934.
- Pratto, F. (2015). On power and empowerment. *British Journal of Social Psychology*.
- Ridgeway, C.L., Berger, J., Smith, L. (1985). Nonverbal cues and status: An expectation states approach. *American Journal of Sociology*, 90(5), 955–978.
- Rucker, D.D., Hu, M., Galinsky, A.D. (2014). The experience versus the expectations of power: A recipe for altering the effects of power on behavior. *Journal of Consumer Research*, 41(2), 381–396.
- Scherr, S., Polst, S., Müller, L., Holl, K. & Elberzhager, F. (2019). *The Perception of Emojis for Analyzing App Feedback*. International Association of Online Engineering. Retrieved from <https://www.learntechlib.org/p/207545/>
- Schmid Mast, M. (2010). Interpersonal behavior and social perception in a hierarchy: The interpersonal power and behavior model. *European Review of Social Psychology*, 21, 1–33.
- Shaw, P., Greenstein, D., Lerch, J., Clasen, L., Lenroot, R., Gogtay, N., Evans, A., Rapoport, J., Giedd, J. (2006). Intellectual ability and cortical development in children and adolescents. *Nature*, 440(7084), 676-679.

- Smith, P. K., Trope, Y. (2006). You focus on the forest when you're in charge of the trees: Power priming and abstract information processing. *Journal of Personality and Social Psychology, 90*(4), 578.
- Smith, P.K., Galinsky, A.D. (2010), The Nonconscious Nature of Power: Cues and Consequences. *Social and Personality Psychology Compass, 4*, 918-938.
- Smith, P.K., Hofmann, W. (2016). Power in everyday life. *Proceedings of the National Academy of Sciences, 113*, 10043-10048.
- Soderberg, C. K., Callahan, S. P., Kochersberger, A. O., Amit, E., Ledgerwood, A. (2015). The effects of psychological distance on abstraction: Two meta-analyses. *Psychological Bulletin, 141*(3), 525.
- Sorrentino, R.M., Roney, C.J.R. (1986). Uncertainty orientation, achievement-related motivation, and task diagnosticity as determinants of task performance. *Social Cognition, 4*, 420–436.
- Statista, The Next Web (TNW). (2019). *Number of People Using Social Media Platforms*. Our World In Data. Retrieved from <https://ourworldindata.org/rise-of-social-media>
- Stel, M., van Dijk, E., Smith, P.K., van Dijk, W.W., Djalal, F.M. (2011). Lowering the Pitch of Your Voice Makes You Feel More Powerful and Think More Abstractly. *Social Psychology and Personality Science, 3*(4), 497-502.
- Thibaut, J. W., & Kelley, H. H. (1959). The social psychology of groups. *American Psychological Association*.
- Tolins, J., Samermit, P. (2016) GIFs as Embodied Enactments in Text-Mediated Conversation. *Research on Language and Social Interaction, 49*(2), 75-91.
- Torrez, B., Wakslak, C., Amit, E. (2019). Dynamic distance: Use of visual and verbal means of communication as social signals. *Journal of Experimental Social Psychology, 85*, 103849.
- Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review, 440–463*.
- Twenge, J. M., Martin, G. N., Spitzberg, B. H. (2019). Trends in U.S. Adolescents' media use, 1976–2016: The rise of digital media, the decline of TV, and the (near) demise of print. *Psychology of Popular Media Culture, 8*(4), 329–345.
- Wakslak, C.J., Smith, P.K., Han, A. (2014). Using Abstract Language Signals Power. *Journal of Personality and Social Psychology, 107*, 41-55.
- World Economic Forum. (2018). *The Global Gender Gap Report*. ISBN-13: 978-2-940631-00-1. Retrieved from [http://www3.weforum.org/docs/WEF\\_GGGR\\_2018.pdf](http://www3.weforum.org/docs/WEF_GGGR_2018.pdf)