LEGITIMACY, STATUS, AND THE ACOUSTIC SIGNATURE
OF DEFERENTIAL SPEECH

by

CHRISTOPHER D. MOORE

(Under the Direction of Dawn T. Robinson)

ABSTRACT

An individual's marshaling of status cues in task situations represents one aspect of self-presentation and serves as a basis from which individuals express, and others interpret, claims to be able to contribute to the group’s success (Berger et al. 1977, 1986). I integrate existing theories of competence-based and dominance-based legitimation into the framework and function of strong and weak status cue gestalts (Fişek, Berger, and Norman 2005), as well as offer and validate a new unobtrusive non-verbal vocal measure of internalized status and collective validation. In particular, the present project features a design examining manipulated authority, manipulated legitimacy (authorization), and vocal adaptation in same- and mixed-sex task groups. A focus on vocal adaptation at the fundamental frequency (F₀) of speech, also called the first harmonic frequency as it refers to the highest common factor of a periodic waveform, builds on recent work by Gregory and Gallagher (2002) that identifies the bandwidth of F₀ between 0.0 kHz and 0.5 kHz as important to processes involving social status and influence. I predict that individuals will adapt their F₀ patterns towards those of higher status group members.

INDEX WORDS: Deference, Influence, Status, Legitimacy, Legitimation, Fundamental Frequency, Vocal pitch, Dominance, Authority, Vocal accommodation
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Like many others, I can say that this dissertation was a long time in the making. From the years I spent earning my M.A. and then working to complete my Ph.D. coursework at the University of Iowa, to being diverted by a final deployment with the U.S. Marine Corps, to the reconstitution of my academic trajectory at the University of Georgia for two more years, to finally finishing this work halfway through my third year as a faculty member at Lakeland College in Wisconsin. Yes, my family, my advisor, and my friends can all attest to this long road of travel.

Personally, I trace the development of the ideas in this dissertation all the way back to U. of Iowa since it was there that I began thinking and working on ways to refine the conceptualization and measurement of many of the key variables used in research on emotion, identity, status, and influence. This present dissertation is the result of this odyssey. It is a two-pronged contribution in that it offers a more refined logic of integrating theories of legitimacy, legitimation, and status; as well as a new unobtrusive measure of status behavior.

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CHAPTER 1
INTRODUCTION

At the group level, collectives of all kinds benefit when status arrangements and work assignments are aligned with the expertise of its members. When meritocratic norms prevail, imputed competence is one of the primary factors contributing to status arrangements as groups form or face new challenges. For the individual joining an established group, the ability to quickly and accurately determine the status arrangements of a group facilitates effective communication by helping her to avoid social faux pas (such as inappropriately addressing or responding to higher and lower status others) leading to subsequent embarrassment (or worse), and aids in the maintenance of the group’s social structure. Even as young children we quickly learn to identify and interact within the context of relatively stable status hierarchies ranging from play groups to families (Strayer and Strayer 1976; Weisfeld and Weisfeld 1984; Pettit, et al. 1990). As adults, our experiences often lead us to assume that those who dominate conversations by speaking in confident tones, speaking first and more often, and more frequently interrupting others; generally “know what they are doing” – or at least that they think that they know what they are doing. Such is the way that dominant vocal behavior is interpreted as evidence for a speaker’s assumed competence. Making demands rather than receiving them; controlling, verses responding to, conversational tempo and vocal tone; are some of the many dominant behavioral patterns that have been examined in the literature.
The aim of this project is to reach a better understanding of the relationship between status cues, legitimacy, legitimation, and the emergence of informal and formal status hierarchies (and/or influence hierarchies) by combining recent theoretical advances in structural social psychology with recent research on nonverbal vocal cues in micro-interaction. Currently, theories pertaining to status and influence in formal and informal groups have seen only limited integration with theories of justice and legitimacy – with the work of Ridgeway and colleagues providing excellent examples of successful theoretical integration and development (Ridgeway and Berger 1986, 1988; Ridgeway 1987, 1988, 1991, 2000; Berger et al. 1998; Johnson, Dowd, and Ridgeway 2006). Yet, while these works offer theory to explain the legitmation process that takes place in social exchange, they do not explain how the status beliefs that provide the raw materials for this process come to be imbued with legitimacy, or credibility, which presumably stems from culturally-held status beliefs. To this end, I offer a formal elaboration to current theory to enhance our understanding of how formal and informal status structures achieve legitimacy.

Specifically, I combine the recent elaborations to the expectation states theory of status cues and cue gestalts (Fišek, Berger, and Norman 2005; also see: Berger et al. 1983, 1986; Ridgeway, Berger, and Smith 1985; Foddy and Riches 2000) with legitimation theory (Ridgeway and Berger 1986, 1988; Ridgeway 1987, 1988, 1991, 2000; Berger, et al. 1998; Johnson et al. 2006); recent work on the interaction between gender, legitimation, and identity verification (Burke, Stets, and Cerven 2007) and elements found in theories of legitimacy and justice (Hegtvedt and Johnson 2000). In doing so, I preserve much of the general framework offered by Fišek and colleagues, and introduce the process of competence-based and dominance-based legitimation into the framework and function of strong and weak cue gestalts. Further, I also
introduce and assess the utility of a specific nonconscious, yet socially-negotiated non-verbal vocal behavioral outcome as an indicator for internalized status structures and collective validation (Kalkhoff 2005) that can be unobtrusively measured in “real time” without interrupting ongoing interactions. This behavioral outcome is vocal F₀ accommodation, originally introduced by Gregory and colleagues (Gregory 1983, 1986, 1990, 1994; Gregory, Webster, and Huang 1993; Gregory et al. 2000; Gregory and Gallagher 2002).

By combining the logics of these related theory programs, I argue that beyond the determination of salience (Berger et al. 1983; Ridgeway et al. 1985; also see Lambert et al. 1960; Lambert, Anisfeld, and Yeni-Komshian 1965; Tucker and Lambert 1969; Ryan, Carranze, and Moffie 1977), the perceived legitimacy of actors’ association with a status characteristic is determined by the nature of its supporting categorical cues. These categorical cues draw their meaning from the social “referential structures” (or “status beliefs”) held by actors. The combinations of these meanings determine the relative credibility of an actor’s “actual” possession of a status characteristic. It is this initial classification that provides the foundation for subsequent performance expectations and the display (and interpretation) of task cues. In brief, Fişek et al. (2005) argue that to the extent that this information (the entire set of categorical and/or task cues) is consistent, the cue gestalt so created is strong. If however there is a dominant subset of consistent cues in a set that also contains inconsistent cues, the overall cue gestalt will be weak. Further, if no subset of cues dominates the set, a cue gestalt is not formed.

I propose that a minor adjustment to Fişek and colleagues’ elaboration provides an opportunity to formally integrate the processes of legitimacy and legitimation into the existing status characteristics and expectation states model. While Fişek et al. (2005) already note that categorical cues help determine the likelihood that an actor possesses a specific or diffuse status
characteristic, and task cues influence an actors’ “apparent competence typification;” they combine them (only) when determining the criteria for strong and weak cue gestalts and they do not offer an explanation for cues pertaining to dominance-based influencing behavior, as opposed to competence-based influencing behavior. Alternatively, I reason that by analytically separating the set of task cues from the set of categorical cues, we can better understand how legitimacy and legitimation are achieved though these separate but interrelated processes.

Finally, a test of this new theory in groups larger than dyads requires empirical measures with unique properties. First, it is necessary to utilize variables that allow researchers to distinguish deference behavior from challenging behavior in such a way that they are not measured in a zero-sum, ratio-type fashion in which each actor’s behavior is quantified only in relation to how it compares to the behavior of other actors. A variable characterized by a metric that locates actors’ relative gains, reductions, or no change in deference or dominance behavior, separate from the behavior of others in the group yet nevertheless still representing meaningful substantive information about how group members evaluate the status positions of one another, would satisfy this requirement. Further, since outcomes related to groups’ status structure are the focus of our arguments, variables appropriate for group-level analysis must be chosen. These variables must also be analytically separate (see: Robinson and Balkwell 1995). To this end, I offer vocal fundamental frequency ($F_0$) accommodation as an indicator of collectively-endorsed status.

Importantly, vocal $F_0$ accommodation serves as an indicator of the internalized status structure of a group and functions to reinforce this structure as well as communicate it to outside listeners. The underlying assumption of the expectation states paradigm holds that “status” is always a relative and situated concept. For example, an individual may only be higher status
because of her relation to a lower status other, and a low status individual in one setting may be a high status individual in another setting. In this dissertation, I concur with Fişek and colleagues (Fişek, Berger, and Norman 1991; Fişek et al. 2005) that it is neither necessary nor advantageous to extend this assumption to the concepts of “status typification” or “legitimacy.”

Yet, the larger question this dissertation addresses is how do individuals reach a shared definition of the situation? I argue that by combining elements of legitimacy, legitimation, and cue gestalt/status characteristics theory, we should arrive at a better explanation. Because I believe that vocal F₀ accommodation is an important status behavior, it stands to reason that the subjective relative ratings of group members’ status and leadership ability will correspond to the patterns of this behavior. Accordingly, the aggregate of Assistants’ ratings of Supervisor’s status and leadership ability are examined and compared to vocal F₀ accommodation behavior and the known formal status structure of these groups to offer additional insight about the utility of this new measure.
CHAPTER 2
DEVELOPMENT OF AN EXPECTATION STATES THEORY OF STATUS CUES

The expectation states theory of status cues offered by Fişek et al (2005) is a formal integration of status characteristics theory (Berger et al. 1972; Berger et al. 1977; Balkwell 1991; Wagner and Berger 1993, 2002) with expectation states theories of nonverbal cues and status (Berger et al. 1986; Ridgeway et al. 1985; Ridgeway 1987; Foddy and Riches 2000). Yet, my new formulation combines these insights with ideas about how verbal and nonverbal cues operate to establish and maintain formal and informal status hierarchies. What follows is a summary of status characteristics theory, some of the key work pertaining to theory of nonverbal cues and status, and finally the expectation states theory of status cues.

Status characteristics theory

Status characteristics theory is one of the most prolific and formally-developed of several theories in the expectations states research program. As a whole, the expectation states research program has developed a remarkable cumulative body of theory and research examining a wide range of social processes that are involved in the emergence of social structure from face-to-face interaction in goal-oriented groups. In its current form, status characteristics theory is based on a formal graph-theoretic mathematical model (Berger et al. 1977) which provides it with the dual advantages of logical clarity and practical flexibility – qualities that have enabled it to serve as a framework into which researchers have integrated other theories from within the expectation
states theory program (Berger et al. 1985; Berger, Fişek, and Norman 1989; Fişek et al. 1991; and Fişek, Berger and Norman 1995).

The expectation states research program is rooted in the work of Robert Bales and colleagues at Harvard in the 1950’s (Bales 1950; Bales and Strodtbeck 1951; Bales et al. 1951; Hare, Borgatta, and Bales 1955). These researchers were primarily interested in the emergence and subsequent maintenance of informal group structure. Several important findings in this work include the innovative interaction process analysis (IPA) technique for coding sequences of interaction, which led to several early and important findings such as the observed regularity with which stable behavioral hierarchies rapidly emerge in homogenous (in terms of external characteristics) informal groups and the existence of a dichotomy between instrumental leaders and emotional leaders. Moreover, their research revealed that those who have the most task contributions accepted by others in the group, have (a) more influence over other group members, (b) initiate more performance outputs (e.g., suggestions or directives) to both the group as a whole and to other specific group members, and (c) have their performance outputs more favorably evaluated than those of other group members.

Joseph Berger and his colleagues later labeled this set of behavioral dimensions the observable “power and prestige order” of the group and further suggested that the reason for the high correlation among these behavioral dimensions was a mutual antecedent called “expectation states” (Berger, Cohen, and Zelditch 1966). *Expectation states* (performance expectations) represent the evaluations that group members hold for each others’ anticipated performances at the group’s task. Berger et al. (1966) proposed the first stages of status characteristics theory by codifying the extensive previous research relating to the emergence and maintenance of power and prestige orders in heterogeneous groups. Their general findings include that (a) behavioral
tendencies tended to reproduce a hierarchical group structure based on the social values of the external characteristics of group members (elements previously thought to be irrelevant to a group’s task), that (b) these tendencies occurred in small groups engaged in collective tasks in which group members were motivated to obtain a correct answer, and that (c) the observable power and prestige order emerged rather quickly.

With the support of ongoing experimental findings, Berger and his colleagues focused on one type of characteristic that they observed to affect interaction between a focal actor (p) and another actor (o), the “diffuse status characteristic” (D) (Berger et al. 1966a; 1966b; Berger and Conner 1969; Berger and Fişek 1970; Berger, Cohen, and Zelditch 1972). A diffuse status characteristic refers to an attribute defined by two differentially valued states (high and low), with each state associated with a performance expectation (e.g., likely to be either proficient or non-proficient at a task) and a consistently valued (positive or negative, respectively) generalized expectation state (i.e., a belief in an actor’s (high or low) competence at generalized tasks (γ)). Berger, et al. (1966b, 1972) showed that deference behavior and individual performance outputs were organized around individuals’ states of D even when D seemed unrelated to the group’s task (T). Further, they described a process of status generalization as states of D provided the basis for expectations of task competence and, therefore, influence and other power and prestige behaviors. Finally, Berger and colleagues also identified task characteristics (C*) as attributes believed to be directly related to the group’s likelihood of achieving the successful outcome of the group’s task. Importantly, Berger and colleagues noted that these processes occurred reliably in groups containing at least two actors engaged in tasks where they could, as a group, either succeed or fail; and when group members believed it both necessary and legitimate for all members to contribute something to the overall effort. These two conditions, task-orientation
and collective-orientation, thus became the primary scope conditions of status characteristics theory.

Several important theoretical assumptions made in by Berger and colleagues bear specific mention. The activation (or salience) assumption enables the determination of which pieces of social information are used by actors to identify status characteristics. Specifically, information will become salient in the situation, and therefore affect status outcomes, if it provides a basis of social discrimination between actors according to some socially meaningful dimension (race or occupational title may readily become salient in situations as they often carry social meaning, but information such as actors’ eye color will not likely become salient, even though it could be used to discriminate actors (that is as long as eye color is not specifically imbued with social meaning (see Elliot ([1968] 2008)). This assumption highlights the important finding that equating characteristics (such as race, when both actors are the same race) not initially relevant to the task do not become salient, and thus do not affect individual positions in the group’s status hierarchy.

The burden of proof (relevance) assumption describes how characteristics that are initially neither associated nor dissociated from the task, become relevant to the task. Specifically, this assumption provides the rationale for how diffuse characteristics are linked to the like-states of task outcomes for each actor, unless that they have been explicitly dissociated from the task. The fundamental idea underlying the burden of proof process is that because diffuse characteristics are associated with similarly-evaluated generalized expectation states, they will become activated and connected to the task via this generalized expectation state, unless this link is explicitly broken. Finally, the basic expectation assumption supposes that individuals’ relative positions in a group’s power and prestige order are a direct function of their relative expectation advantage (difference between the actors’ expectation states) over others.
Berger, et al. (1972) provided updated formulation to the 1968 theory by introducing “specific status characteristics” (C). *Specific status characteristics* are attributes possessing at least two differentially valued states (e.g., high and low) associated with a specific performance expectations (e.g., people believed to possess a high state of physical strength are expected to perform well at moving heavy objects). Also, specific status characteristics may be tied to tasks to which they are unrelated, so long as they meet the activation and burden of proof assumptions. While highly important, it was soon clear that the incorporation of specific status characteristics to the theory made necessary an articulation of how the possessing of multiple salient characteristics (diffuse and/or specific) simultaneously would affect actors’ performance expectations.

Not surprisingly, in 1977 Berger and colleagues presented a significant update to status characteristics theory by formalizing it employing graph theory and adding two key assumptions (Berger et al. 1977). This revised version of status characteristics theory attempted to account for the effects of multiple, salient status characteristics in a single situation, possessed by a single actor. It also attempted to account for empirical findings that indicated once expectation structures were formed, they generally resisted change even when new actors with new status information entered a group. Finally, this new theory explained why the effect of specific status characteristics that are unrelated to the group’s task were generally less powerful than diffuse characteristics or specific characteristics related to the group’s task (via the burden of proof process).

As noted previously, the scope conditions of status characteristics theory limit its application to situations where actors are collectively engaged at working on a valued task. These collective task-related situations, called *S* situations, are formally modeled from the point-of-
view of a focal actor in graph-theoretic structures called *S-graphs* (see also: Berger et al., 1985). S-graphs contain points for information about the status elements all of the actors in the situation possess, the subsequent expectation states which may be activated in the situation, and the outcome states of the group’s task. Lines connecting these points express the nature of the relationship between these different elements according to the theory. Figure 2.1 depicts a simple S-graph where two actors are discriminated by a diffuse status characteristic that is not specifically related to the task, but infers general ability and competence.

![Diagram](image)

**Figure 2.1:** A Completed Structure for Two Actors Discriminated by a Diffuse Characteristic.

This figure illustrates a situation where actors *(p)* and *(o)* are discriminated based on a single diffuse status characteristic *(D)*. Actor *(p)* possesses the “high” state of a diffuse status characteristic, whereas actor *(o)* possesses the “low” state (e.g., this diffuse status characteristic might be gender, and actor *(p)* is a man and actor *(o)* is a woman). Diffuse characteristics are associated with expectations for an actor’s *generalized competence* *(Γ)*. These expectations for generalized competence, in turn, lead to beliefs that these actors possess *task characteristics* *(C*) to match the valence of the associated diffuse status characteristics and generalized
competencies. Task characteristics are attributes believed to be directly related to the group’s likelihood of achieving the successful outcome for the specific task (T) before the group. It follows that each of these actors has two separate paths leading to either the positive or negative outcome on the group’s task, T(+), and T(–), respectively. Actor (p) has two positive paths, one 4-length (p —— D+ —— Γ+ —— C* —— T+), and one 5-length (p —— D+ —— D— —— Γ+ —— C* —— T+). Actor (o) has the opposite: two negative paths, one 4-length (p —— D— —— Γ— —— C* —— T–) and one 5-length (p —— D— —— D+ —— Γ+ —— C* —— T+). Accordingly, Actor (p) enjoys a status advantage.

The first new assumption offered by Berger et al. (1977), the “sequencing” assumption, describes how emerging status structures are completed from the point of view of the focal actor, when new actors possessing new status information enter the situation. The sequencing (or sequence of completion) assumption holds that all salient status information will become relevant to the states of the task outcome through both the activation and burden of proof processes. In addition, Berger and colleagues incorporate an “aggregation” assumption that suggested all salient status information is combined for each actor to form an aggregated expectation state, with the difference between the focal actor’s and other’s aggregated expectation state representing the focal actor’s (p) expectation advantage.

Subsequent researchers have debated the process by which status information is combined in multiple-characteristic settings. An empirical test of the Berger et al. (1977) version of status characteristics theory (Berger et al. 1992) confirmed that their proposed principle of organized subsets is superior to three competing methods of accounting for multiple status characteristics (the Lenski balancing principle (Lenski 1966), the majority balancing principle (Sampson 1963; Zelditch and Anderson 1966; Geschwender 1967), and the canceling principle
(Sobieszek 1972; Freese 1976; Norman, Smith, and Berger 1988) – suggesting that in order to combine inconsistent status information group members act as though they first separately calculate the value of the positive subset of status information and the value of the negative subset of status information, then they combine (subtract) the values to arrive at a group member’s aggregated performance expectation.

In addition, Berger and colleagues suggest a mathematical function for determining the magnitude of the effect of multiple status characteristics on task outcomes (see also: Fişek, Norman, and Nelson-Kilger 1992). This function captures the attenuation principle – the idea that adding new consistent status information has a diminishing effect on task outcomes. Also, the inconsistency principle suggests that a single piece of positive status information in a field of negatively-evaluated status information has a greater marginal effect than it would if it were presented alone. In summary, the principle of organized subsets, the attenuation principle, and the inconsistency principle are collectively the three principles of aggregation.

However, recent work by Martha Foschi (2000) pulls together theory on “double standards” (see also: Foschi 1989) and Foddy and Smithson (1989) conceive of “fuzzy sets” to describe how individuals amass “plausible evidence” of their competence. In particular, these ideas suggest that individuals with different initial status value, based on differences on their diffuse characteristics such as their race or gender, face different standards to which they are held accountable by others to “prove” their likely worth to the group. As such, real-world outcomes for combining status information about men and women, for example, might not always conform to predictions based on these aggregation principles. To date, however, it is my belief that empirical evidence confirming such a failure has not been published.
Once the S-graph is complete, the valence of the paths linking each actor to the successful and unsuccessful task outcome states may be determined. The formation of aggregated expectation states assumption states that to determine the expectations for each actor, all of the paths connecting each actor to both task outcomes states are combined. Specifically, for each actor, the paths that connect him or her to the successful outcome state provide for positively-evaluated expectations while paths linking him or her to the unsuccessful outcome state provide for negatively-evaluated expectations. Shorter-length (more direct) paths are considered more powerfully influential in determining the expectations that are formed for each actor. Each actor’s like-signed path subsets are combined according to the following function:

\[ f(i \cup j) = f(i) + f(j) - f(i)f(j) \]

Once the expectations for each actor are calculated, the actor with the greater expectation states is determined by calculating the mathematical difference between the actors’ expectation states. The actor with this higher expectation state is assumed to have an expectation advantage over the other actor(s).

The final assumption, the basic expectation assumption originally put forth by Berger et al. (1966a, 1966b, 1972) was updated in by Berger et al. (1977) to account for the new aggregation process. This assumption holds that the power and prestige position of actor (p), with respect to actor(s) (o), is a direct and continuous function of p’s expectation advantage (or disadvantage). Thus, individuals higher in a group’s power and prestige order are (a) afforded more opportunities to contribute to the group’s task, (b) do contribute more to the group’s task, (c) find that their contributions more highly evaluated by others, and (d) are able to exert more influence than those lower in the hierarchy (see Appendix A for a full statement of the core assumptions of status characteristics and expectation states theory).
Status cues and status structures

There is a considerable body of theory and research in the psychological, sociological and communication literatures on the effects of status cues in small face-to-face groups (Willard and Strodtbeck 1972; Nemeth and Wachtler 1974; Conner 1977; Keating, Mazur, and Segall 1977; Ryan, Carranze, and Moffie 1977; Rosa and Mazur 1979; Mazur et al. 1980; Lee and Ofshe 1981; Dovidio and Ellyson 1982; Street and Brady 1982; Berger and Zelditch 1983; Mazur 1985; Dovidio et al. 1988; Mast 2002; Mast and Hall 2004; Hall, Coats, and LeBeau 2005). In general, status cues encompass any behavior or social object that provides information about individuals’ social status. Status cues range from obvious material or physical indicators (i.e. “status symbols”) such as extravagant clothing or an official’s badge, to subtle markers such as posture or (having a “confident” or “timid”) vocal tone.

Erving Goffman’s work (1956, 1959, 1967, 1969, and 1981) invites one to consider the content of the (essentially) nonconsciously-governed, yet well coordinated nonverbal rituals that people engage in during face-to-face interaction. The format of a situations’ proper “state of talk” is often seamlessly entered into by individuals of varying status and background—and when faux-pas occur, they are usually immediately apparent (Goffman 1967). Similarly, Thomas Scheff (1988) describes the “deference-emotion system” as one that generally “functions outside of awareness (1988:396).” Scheff also uses the words “joint attention,” “attunement,” and the “sharing of meanings and feelings” to emphasize a shared system of meaning in his review of the phenomena described by Goffman (1990:100) (see also: Gregory 1994). Finally, a rich survey of the effects of status cues on the status organizing process within the conceptual framework of the expectation states research program is provided by the work of Cecilia Ridgeway, Joseph Berger,
and their colleagues (Berger et al. 1983; Ridgeway 1984; Ridgeway et al. 1985; Berger et al. 1986; Ridgeway 1987).

In their review of empirical research on status cues, Berger et al. (1986) classify status cues according to two dimensions: an indicative-expressive dimension and a task-category dimension. In general, the indicative-expressive dimension is concerned with the transmission of status information – how the information is sent and received. Further, the task-category dimension is concerned with the nature, or content of status information – what type of information is being communicated. Importantly, Fişek et al. (2005) specify that status cues do not provide direct paths to status, but rather they serve are indicators of status elements and thus they affect status outcomes only through the social constructs they support.

**Indicative cues** serve as explicit evidence that directly identifies or labels a person as someone who possesses a particular status or condition. A soldier’s insignia and uniform, official or honorary titles such as “prisoner,” “professor,” or “Misses” when used before one’s name, or declaratives such as “I am an expert at this task,” or “I am the Senior Vice President of this company,” are all indicative cues. This type of cue makes a direct claim to the possession of particular status characteristics, generalized states of general abilities, and/or specific competencies. Alternatively, **expressive cues** provide more indirect and implicit status information; such as an individual’s use of personal space, duration of initial eye contact when meeting someone for the first time, vocabulary and grammar proficiency, and vocal tone. These cues are quite literally “expressed” or to use Goffman’s (1959) phrase, “given off” in interaction, some intentionally and others unintentionally.

**Task cues** provide information on what actors are doing and what might they be able to contribute to the group’s efforts at successfully completing their task. These cues make explicit
claims or permit inferences about actors’ general problem-solving ability or specific abilities they possess pertaining to the immediate group task. An example of an indicative task cue would be someone making the statement “I just happen to have a great deal of experience with this kind of problem,” whereas the same person’s confident vocalizations and sustained direct eye contact are examples of expressive task cues. *Categorical cues* give general information about the larger social groups to which actors belong. An actor’s membership in a particular social group may have status implications and information about an actor that signals such a membership serves as categorical cues. Such cues might take the form of one’s style of dress (e.g., the wearing of a hijab), occupation (e.g., “librarian”), regional dialect or accent, or skin color. Foddy and Riches (2000) extend the earlier work by Berger et al. (1986) and provide empirical evidence to support the notion that task cues (such as English language fluency) that imply competence-related information inconsistent with actors’ expectations already based on observed categorical cues (such as a non-native English speaker’s accent) can mediate and sometimes overcome the effects of such categorical cues in ongoing interactions.

Further, Fişek et al. (2005) expand two earlier empirical generalizations about task cues offered by Berger et al. (1986). With regard to the first generalization, Fişek and his colleagues propose that the earlier assumption that homogenous situations describe groups that contain actors who are not discriminated by diffuse status characteristics, may be expanded to apply to all types of status cues (categorical and task), and adjusted to explain heterogeneous situations as well as homogeneous situations. In keeping with the logic of the expectation states research program, they argue that because all status cues function merely as elements that contribute to the identification of either status characteristics or the “apparent competence typification” they introduce (2005:88); all status cues thus enter into the orderly and predictable formation of
expectation states. The second empirical generalization originally identified by Berger et al. (1986) is that task cues appear to function much the same as “status behaviors” (i.e., the giving and/or receiving of action opportunities) in face-to-face interaction. Fişek et al. (2005) thus propose that task cues operate both as stand alone claims to status elements as well as responses to others’ claims to the same, thus making them interpretable by the same calculus as is used for status behaviors in status characteristics theory.

Having reached these conclusions, Fişek and his colleagues contend that status cues do not typically operate independently, but rather they form sets of cues called cue gestalts. Cue gestalts encompass the range of status cues pertaining to each group member – such that an actor who sees another actor who is relatively large, has a male-shaped body, male facial features, male hair style; wearing male-type clothing, speaking with a deep voice, etc.; simply sees that the other as a “male,” due to these combined cues. The individual treatment of each of these cues for male is not necessary to the status organizing process, but inconsistencies among the cues (e.g., if the person described above was wearing “female clothing” but was otherwise the same) weakens the overall “male” gestalt, while consistency strengthens the overall “male” gestalt (see also: Gollob and Fischer 1973; Gollob and Rossman 1973; and Gollob 1974).

Fişek and colleagues specify that the standard formal theoretical model of status characteristics theory presumes “strong cue gestalts,” and that “weak cue gestalts” can be added to the model to account for their influence on actors’ ties to status elements. A strong cue gestalt is a set of status cues such that suggest that is highly likely that the actor who displays or emits them does in fact possess the relevant status element. Consistent and well-agreed upon cues pertaining to a particular status element can constitute a strong cue gestalt. For example, a well-groomed man wearing a blue uniform, mirrored sunglasses, holstered firearm, shiny badge,
stepping from a marked patrol car, displays a strong cue gestalt for the identity of a “patrol officer” and likely more generally an authority figure. Familiarity with the content of certain strong cue gestalts serves as a resource for successful professional character actors and the basis for experimental researchers’ decisions when setting up realistically-staged interaction sequences (consider for example the management of costume, protocol, and setting by Zimbardo and colleagues (Haney, Banks, and Zimbardo 1973) to create strong cue gestalts for prisoners and guards). Because the effect of strong categorical cue gestalts is only to mark and support existing status elements, it is not necessary to incorporate it as a separate element in the S-graph. However, Strong task cue gestalts have a separate function related to task-related behavioral expectations which is detailed in the discussion of “status typification” (below).

Status cues that convey inconsistent information create weak cue gestalts. A weak cue gestalt is a set of status cues such that the actor who displays or emits the cues is expected to be “given the benefit of the doubt” that she in fact possesses the relevant status element. Again, consider the description of the man from the preceding paragraph. Should a motorist on an interstate highway observe this man walking up to their stopped vehicle after having gotten out of not a marked patrol car, but instead a rusty pick-up truck, the motorist may feel less confident about the man’s identity, but might still believe that the man is a patrol officer. Noticeably weak status cues gestalts cast doubt on the relevant actors’ claims to possess particular status elements. Finally, it is of course possible for a set of cues to be sufficiently ambiguous that it forms no cue gestalt at all. If the man mentioned above were also not wearing the sunglasses, shiny badge, or holstered weapon, he would likely not possess enough cues to muster even a weak cue gestalt for “patrol officer”—though perhaps instead he might possess sufficient cues to be labeled a “mechanic.” Since weak cue gestalts affect the ties between an actor and particular status
elements, new symbols for weak categorical cue gestalts ($\delta\pm$) and weak task cue gestalts ($\alpha\pm$) are added to the S-graph to account for their effects.

Since individual status cues or cue gestalts do not directly imply status, but rather operate instead as markers of status elements, Fišek et al. (2005) specify that categorical cues provide information about whether actors possess diffuse (D) or specific (C) status characteristics; while task cues provide more abstract information about actors’ “status typifications” (Fišek et al. 1991; see also: Berger and Luckmann 1966). Status typifications are classifications of behaviors believed to be generally performed by either high or low status (or state) individuals, given a particular setting. Diametric roles or abilities such as “supervisor—assistant,” “competent—incompetent,” and “physician—patient” are examples of “real world” relationships that involve actors who are expected to perform certain “typified” behaviors. Fišek and colleagues incorporate high status and low status typification states into their model as B(+) and B(−), respectively.

After orienting their conceptual framework to the generalized role pairing of “leader—follower,” Fišek et al. (2005) assume that a particular type of status typification is likely to exist between two such actors. Because leader—follower relationships, absent direct and effectively-wrought dominance, tend to allocate status according to the possession of general- or task-related abilities, They also identify an “apparent competence(-incompetence)” typification as the status typification to which task cues are linked in such pairings. Specifically, when actors become associated with strong task cue gestalts (B+) or weak task cue gestalts (B–), they produce apparent competence typification states relevant to abstract task ability ($\gamma\pm$). This generalized ability state (i.e., actor is generally “good at” or “not good at” most activities) then becomes relevant to the like-signed task outcome state (i.e., being generally competent or incompetent at most things implies that one is likely to be proficient or non-proficient, respectively, at the
immediate task). With the addition of this status typification parameter, all elements of Fişek et al. (2005) model are in place. The following is the set of criteria Fişek et al. provide for the determination of status cue gestalts (2005:90):

1. A consistent set of cues, regardless of type, generates a strong cue gestalt.

2. An inconsistent set of cues with a predominant subset generates a weak cue gestalt.

3. An inconsistent set of cues without a predominant subset does not generate a cue gestalt.

4. A single indicative cue, whether task, or categorical, generates a strong cue gestalt.

5. A single expressive categorical cue, if intense, generates a strong cue gestalt; and a single expressive task cue, if frequent, generates a strong cue gestalt. Otherwise such cues generate weak cue gestalts.

**Computation of expectation advantage and stay response**

In order to calculate expectation advantage and predicted stay response [P(S)] rates, numerical values for the strengths of paths of different lengths are needed. I use the path values obtained by Fişek et al. (1992) which are (0.1358, 0.0542, and 0.0211) for path lengths 4 through 6, respectively. In the graph structure shown here in Figure 2.2:
The actor, $p$, is task connected by two positive paths of lengths 5 and 6 through $D(\cdot)$. Combining the path strengths gives the expectations for $p$:

$$e_p = 1 - (1 - 0.0542)(1 - 0.0211) = 0.074.$$  

The actor, $o$, is connected to the task outcomes with two negative paths of lengths 4 and 5 through $D(\cdot)$, and a positive path of length 4 through $B(\cdot)$. Therefore the expectations for $o$ are as below:

$$e_o = 0.1358 - [1 - 0.1358](1 - 0.0542)] = -0.047.$$  

Thus the expectation advantage of $p$ over $o$ in this structure is:

$$e_{po} = e_p - e_o = 0.027.$$  

where $e_p$ and $e_o$, respectively, represent the performance expectations of the actor, $p$, and the other with whom she is interacting, $o$. In the standardized setting, the expectation advantage and

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1 Fişek et al. (2005) make the simplifying assumption that all salient status cues are equally “important.”
the proportion of stay response \([P(S)]\) are computed using the following linear function:

\[
P(S) = m + qe_{po}
\]

In this function, \(m\) and \(q\) represent empirical constants meant to capture differences in particular settings such as qualities of the subject population or experimental manipulations to the degree of collective orientation (this formulation most recently offered by Fişek et al. (2005)). A concrete example fitting these parameters could be a situation in which \(p\) and \(o\) are differentiated by a diffuse characteristic – such as military rank, where \(p\) is a member of the Reserve and \(o\) is “active duty.” Further, the lower ranking active duty member displays a weak cue gestalt of positive task cues, which contributes to his apparent competence typification. This provides the otherwise severely disadvantaged \(o\) an additional positive 4-length path.

Fişek et al. (2005) succeed in specifying a process whereby status cues can generate weak and strong cue gestalts, and introduce the apparent competence–incompetence status typification. The results of their review of previous experimental research (studies in the Nemeth and Wachtler situation: Mohr 1986; Sev’Er 1989; Driskell, Olmstead, and Salas 1993; and studies in the standardized experimental setting: Tuzlak and Moore 1984; Rainwater 1987; Riches and Foddy 1989; Foddy and Riches 2000) supports their formulation. However, further independent tests of their model are needed and it appears possible to incorporate elements of legitimacy and legitimation theory into this new formulation. Further, research is needed to examine the apparent “double standards” for competence argument (Foddy and Smithson 1989; Foschi 1989, 2000) as it relates to leader-evaluations and influence outcomes.

To address these issues, I outline several aspects of legitimacy and legitimation theory in the next chapter that contribute to processes related to the function of status cue gestalts and task cues in general. Specifically, the degree to which categorical cues associated with a status
characteristic correspond to one another strengthens or weakens claims actor’s make regarding the possession of that characteristic. This correspondence then, contributes to the voracity – or face validity – of such claims. One’s credibility, or in other words the legitimacy of one’s claim to “be someone,” is the focus of these cues. Both the external (authorization) legitimacy predicated on the internalization of, and reliance on, widely-held beliefs regarding the relative status positions of certain groups in society according to each group’s stereotyped competences, and the tacit acceptance by local group members whose actions demonstrate to others their apparent belief in the legitimacy (behavioral endorsement) of status claims, rely on the use of categorical and task cues (Berger et al. 1977; Ridgeway and Walker 1995; Ridgeway 2001). Therefore, legitimacy and legitimization processes are both central to the ubiquity and persistence of the “taken for granted” nature of that categorical cues such as gender, or task cues such as the initiation and maintenance of eye gaze, and are associated with specific status beliefs that have come to possess an independent “reality” all of their own.
CHAPTER 3
JUSTICE, LEGITIMACY, AND LEGITIMATION IN RELATION TO STATUS CUES

Status cues are laden with culture-specific normative expectations. They are, quite literally, the fundamental “significant symbols” that identify social objects and persons with socially meaningful labels (Mead 1934). Status cues bear the meanings and beliefs about how they may combine as sets (or gestalts) to signal the possession of various status elements. The relative homogeneity of categorical cues associated with a status characteristic strengthens or weakens the credibility, or legitimacy, of an actor’s claim to possesses it; and thus its salience. In this way, the salience of status elements is directly linked to status cue gestalts. The “taken for granted” nature of agreement with which significant symbols such as language come to possess an independent “reality” all of their own is generally extended in practice to other significant symbols such as the categorical cues of one’s apparent gender, or task cues such as one’s initiation and maintenance of eye gaze, when it comes to determining if what they collectively denote is valid, believable, and worth taking into account when forming expectations for an individual.

The nuanced strength of each status characteristic, taken together yet factoring the decreasing impact of new information according to the principles of aggregation, represents the raw material that actors base their subsequent behaviors (to include further cue displays). The same can also be said about the role of status cues to status elements (status characteristics and status typifications). These cue displays combine to form the collection of information that
creates either strong or weak cue gestalts which affects the legitimation of status. In this chapter, I explain how legitimacy functions as a primary source of legitimation within the framework of the expectation states theory of status cues.

**Justice and legitimacy**

Legitimacy is generally defined as a state of appropriateness accorded to a social entity. Suchman (1995: 574) explains that, “when one says that a certain pattern of behavior possesses legitimacy, one asserts that some group of observers, as a whole, accepts or supports what those observers perceive to be the behavioral pattern, as a whole—despite reservations that any single observer might have about any single behavior, and despite reservations that any or all observers might have, were they to observe more.” But what makes a social relationship or claim “legitimate” and/or “just?” To answer this question one must consider how social relationships become integrated within the context of existing or emergent social norms, values, and beliefs. The research literature in a wide range of fields expands upon this compound question in a variety of ways. Social relationships, like specific claims and acts, can be perceived by one group as legitimate and/or just, while members of another group may hold the opposite opinion. Yet, the concept of legitimacy is more general than the concept of justice. The notion of “justice” may generally be linked to individuals’ feelings about what is “right” according to their understanding of some higher-order entity to which they feel bound (such as according to generalized cultural support) (Berger and Luckman 1966), but a relationship or group hierarchy need not structured in such a way that each group member personally believe it is “the way it ought to be” for it to be considered “legitimate.”

In general, the justice literature focuses on individuals’ perceptions of just or unjust procedures or rewards/punishments, while researchers studying legitimacy are generally
concerned with collective reactions to events and their effects on the groups’ structure. Jasso’s (1980) work proves to be an exception to this generalization as she finds that actors do consider what they believe others think is fair when formulating their own assessments of justice. In some of their recent work, Hegtvedt and Johnson (2000) incorporate insights from the expectation states research tradition to offer predictions regarding the effects of both endorsement (support from peers and subordinates) and authorization (support from superordinates) on individuals’ reactions to, and assessments of, situations of relative justice and injustice. This work is important for it sets the stage for linking the processes of authorization and endorsement to the concepts of categorical cues, task cues, and status characteristics – more on this shortly.

In *Economy and Society*, Max Weber ([1921]1968) writes that a social order is legitimate or “valid” to the extent that its members believe that they must obey the operating norms or rules associated with it (regardless of whether they believe them to be appropriate). Weber observes that legitimacy is more effective than sheer dominance (force) in enabling leaders to issue directives that are willingly complied with over time. In their theory of formal organizations, Dornbusch and Scott (1975) further specify two aspects of the process whereby legitimacy serves as the foundation of a leader’s authority. In doing so, they expand the description of the process of how the processing of information pertaining to external legitimacy precedes subsequent internal legitimation processes in groups. Specifically, they identify the two elements of legitimacy as propriety and validity. *Propriety* refers to an actor’s belief that the groups’ rules and behavioral norms are both proper and desirable. In contrast, *validity* refers to an actor’s belief that she is obliged to obey these norms, even if she does not otherwise approve of them. In other words, these two concepts separate what “ought to be” from what “is (and will be).” In addition, Dornbusch and Scott define the condition that exists when the support for the group’s
rule and behavioral norms comes from individuals who occupy higher positions in the organization, as authorization. Further, similar support from individuals of equal or lower status than the focal actor is defined as endorsement (for a more detailed review, see: Stolte 1994).

Walker and Zelditch’s (1993) continue the argument that the legitimacy (of authority) is fundamentally a cooperative and negotiated process rather than the collection of group members’ private independent consent. Importantly, Walker and Zelditch show that when an authorities’ position is both strongly authorized and endorsed, actors are more likely to comply with his directives, even in the face of weak propriety, because disobedience under these conditions comes with the risk of formal sanctions from superordinates and/or informal sanctions from peers and possibly even from subordinates (Wagner 1988; Youngreen and Moore 2008). Further, research has shown authorization to be independently more important than endorsement to compliance and subordinates’ impressions of supervisors’ legitimacy (Ford and Johnson 1998).

In addition, Walker, Zelditch, and colleagues suggest that validity functions to enhance actors’ sense of propriety about the groups’ rules, and it also has an independent effect on the likelihood that actors will attempt to change the rules. Endorsement and validity serve to maintain, and sometime create one another, and both enhance the propriety of a structure over time (Thomas, Walker, and Zelditch 1986; Walker, Rogers, and Zelditch 1988). Others have also demonstrated that while both propriety and validity contribute to the stability of reward structures, validity is more powerful in reducing the likelihood that individual members will attempt to change the groups’ rules even when they feel the system (of rewards) is unfair (Johnson and Ford 1996).

In this dissertation, I propose that endorsement and authorization intermingle in the process of identifying strong or weak cue gestalts. Defacto authorization occurs external to the
situation in that for example, it is by definition a property of high status institutionalized positions and thus it serves as a key element of their formal authority. However, when the legitimacy of leaders’ position (or the occupier’s claim to said position) is reduced by, for example, a higher authority pronouncing that the assignment of the current leader was arbitrary (e.g., explicitly not related to task-proficiency), then this information weakens the otherwise stable categorical-cue gestalt and task-cue gestalt of the leader. Since authorization is a “built-in” feature of institutionalized leaders, when information that challenges a leaders’ presumed general and/or task competence becomes salient to group members, it is incorporated into the leaders’ cue gestalt, but it may not be sufficient to weaken the cue gestalt. Thus, “no news is good news” for institutionalized leaders as they automatically enjoy the legitimacy that their institutionalized position offers (see also: Lucas 2003).

Of course, highly “secure” (low threat to legitimacy) positions are found only in highly institutionalized structures. Individuals who communicate strong categorical cue gestalt that supports the propriety of their claim to their position are also in highly secure locations relative to those with weaker cue gestalts (see Ridgeway, Johnson, Diekema (1994) for an empirical study examining comparing competent leaders who differed on categorical cues, with some “carrying over” disadvantageous diffuse status information).

The general social process of legitimacy

Ridgeway and Walker (1995) describe legitimation as “the process by which patterns of social action acquire a normative character,” and Scott (1995) argues that formal organizations require ongoing cultural endorsement (in addition to material and technical resources) in order to maintain their legitimacy. The presumably widespread beliefs about the way things “typically are done” and/or as how things “ought to be done” are rooted in the broader taken-for-granted
cultural framework of beliefs that are carried into organizations in the minds of their members. Similarly, members of informal small groups are influenced in the way they construe their groups’ hierarchies as legitimate by processes in which these widely-held consensual beliefs create strong expectations for what events are likely to occur (Ridgeway and Berger 1986, 1988). Accordingly, emergent status arrangements will be more easily endorsed by group members when they are implicitly or explicitly aligned with the externally-located cultural framework of status beliefs and norms (Hegtvedt and Johnson 2000; Zelditch 2001; Zelditch and Walker 2003; Walker 2004). Should the status claims of an actor challenge the expectations evoked by these external beliefs and norms in goal-oriented groups, other group members will likely implicitly or explicitly communicate their resistance to these claims.

However, these definitions pertain to situated behavior that is embedded in a pre-existing legitimate/normative social order. To understand the general social process of legitimacy, it is necessary to understand how it informs the transformation described by Homans ([1961]1974) as “what is, becomes what ought to be.” For example, actors may attempt to overcome resistance to their status claims by explicitly demonstrating how they contribute towards the fulfillment of the group’s immediate needs/goals. If such a status innovation is successfully negotiated under these (or other terms) and obtains the appearance of acceptance by the group, it becomes part of the localized consensual definition of the situation and acquires implicit (or perhaps explicit), localized, short-term validation (endorsement) as long as situational conditions are consistent with the initial justification for the status innovation. When such innovations remain in place and appear to group members to be generally accepted and consensual over long periods of time (e.g., they become part of the new ever-emergent “reality”), even if individual group members privately disagree with them, they take on the properties of new (local) cultural schemas and are
increasingly likely to be accepted and communicated to others as valid social facts (Ridgeway 2000; Ridgeway and Correll 2006). In short, legitimacy depends on the “…apparent, though not necessarily actual, consensus among actors in the local situation that most people accept the object as legitimate (Johnson et al. 2006).”

The perception of this shared belief is often sufficient in establishing new and resilient beliefs about the correspondence between competences, categorical cues, and status (Walker 2004). Importantly, these locally-created status beliefs can be spread as group members interact with outsiders and contribute to new emergent status beliefs in new situations. Again, because these individuals have come to believe that these social facts are generally accepted by others in their local setting, they may perceive that these same social facts will be accepted as valid by others in new situations. Once this transference has begun, such status beliefs may become part of an increasingly-wide status quo. That is, they become part of the very same set of implicit cultural beliefs that individual carry with them from one social encounter to another and use to frame their behavior (Ridgeway and Balkwell 1997; Ridgeway et al. 1998; Ridgeway 2000; Ridgeway and Erickson 2000; Ridgeway and Correll 2006). Such beliefs thus enjoy the appearance of consensual acceptance that subsequently creates strong social expectations to accept them as legitimate (or at least act as though they are accepted) – even against one’s own possibly “better” (but private) judgment. In this way, with respect to the perpetuation of social inequalities and ineffectual practices, the process also explains how, “…potentially optimal ideas often disappear... [and how] widespread consensual beliefs, such as status beliefs and cultural capital, fuel the reproduction of inefficiency and inequality in groups and organizations (Johnson et al. 2006).”
More specifically, Johnson et al. (2006) identify four stages that are involved in the legitimation of new social entities. The first stage involves the creation of social innovations at the local level that are in response to the group’s needs or goal attainment. Second, in order for these new forms to acquire legitimacy, they must be perceived by group members as being consonant with the broader taken-for-granted social framework of cultural beliefs. When new social objects initially “pass” this test, they earn tacit acceptance either explicitly or implicitly by the actors in the local situation. Third, once locally validated, these newly accepted social facts may be carried by group members to into new situations. The diffusion of these new forms occurs readily to these new groups when members of the original group present them as “any other” taken-for-granted fact – particularly if the justification that supported the innovation’s original acceptance pertains to the new group’s needs and goals (though because the innovation is presented as a “fact” to this new group, the threshold its companion justification needs to meet is less stringent than in the original group). Fourth, after repeated group-to-group transfers (because of this diffusion process), the appearance of a consensual belief across multiple situations eventually emerges and so too does the perception of a widespread general consensus in favor of the initial innovation. At this stage, the innovation has achieved general social validation.

Recall that by definition, categorical cues refer to characteristics that enjoy the normative, taken-for-granted, and I argue presumably legitimate (authorization from the larger culture and the endorsement / perceived agreement from peers) link to general competency. Importantly, the source of the status-value of these cues is the patterns of their normative use in social interactions. Normative social interactions between subordinates and superordinates in the context of highly institutionalized environments reify the status value of indicative and
expressive task cues and categorical cues. These interactions produce the behavioral exchanges that serve as the “evidence” of a subordinate’s peers’ endorsement of their leader.

In this way, categorical cues are linked to *status beliefs*, which are defined as widely-held cultural schemes regarding the relative status positions in society of certain groups (such as those based on gender, race, education, or occupation) (Berger et al. 1977). Status beliefs refer to assumptions about the evaluative ranking of one group compared to another according to each group’s stereotyped competences (Ridgeway and Walker 1995; Ridgeway 2001). Expectation states research suggests that when status characteristics become salient they produce differential performance expectations. Once formed, these expectations are communicated and maintained by the group.

Status beliefs possess varying levels of externally-located legitimacy. These status beliefs are then largely responsible for the process of legitimation as they influence the way combinations of status characteristics are evaluated. The homogeneity of the set of traits that support actors’ status characteristics is expressed, in general, by the concept of “cue gestalt” offered by Fişek et al. (2005). Like Ridgeway et al. (1985) and Fişek et al. (2005), I argue that categorical cues, nonverbal categorical cues in particular, dominate the process by which external status characteristics become salient to actors in the first moments of interaction. Further, I argue that by influencing both the salience and evaluative processes concerning these cues, this is the primary way that categorical cues contribute to the impression of generalized authorization and thus come to effect internal status relations of face-to-face groups through their subsequent influence on the legitimation (endorsement) process. Further, task expressive cues contribute to the endorsement process by way of influencing the salience of the apparent competence-incompetence typification. In short, cues that invoke multiple and consistent referential beliefs
about an individual, particularly in situations with high status differentiation *between* individuals (Kalkhoff 2005), can reinforce relevant performance expectations, and/or the salience of status characteristics, resulting in subsequent reinforcement on the individual’s status position (Ridgeway et al. 1985; Ridgeway and Berger 1986, 1988; Ridgeway 1988; Foschi 2000; Ridgeway and Erickson 2000; Johnson, et al. 2006).

Another related line of research that offers an explanation for these findings highlights the "attenuation principle" from status characteristics theory (see also: “confirmation bias” (Watson 1960)). Specifically, Roshotte and Smith-Lovin (1997) find weak support for the arguments set forth by Berger et al. (1977) and Fişek et al. (1991) over those offered by Skvoretz and Fararo (1996) with regard to the relationship between status cues and diffuse status characteristics. Specifically, that additional high-status task cues have more impact for individuals with low diffuse status than for individuals with high diffuse status (also see: Foddy and Riches 2000). These findings contribute to the evidence suggesting that cue gestalts are aggregated similarly to status elements.

While both authorization and endorsement are sources of support for a groups’ structure, only authorization is “external” to the face-to-face interactions of the group. The interactions that do occur are the “internal” activity from which endorsement emerges. Researchers in the expectation states tradition suggest that a key barrier to the stability of the status structure in groups formally lead by individuals who are members of typically status-disadvantaged social groups (women, racial minorities, etc.), and otherwise comprised of others from more status-advantaged groups (e.g., white males), is that the group’s structure is under constant assault from the internalized exogenous normative expectations each of the group members bring with him or her to the group from the overarching external culture (Zelditch and Walker 1984, 2000;
Ridgeway and Berger 1986, 1988; Berger et al. 1998; Walker and Zelditch 1993). These preexisting expectations loom as a constant challenge to the legitimation of such a group’s status structure. Further, even if individuals from typically disadvantaged social groups are successful in obtaining localized endorsement, their initial disadvantage based on their particular stigmatizing diffuse characteristic(s) will often carry over into new situations and create resistance from new others. Herein lies how status structures remain remarkably stable - even when individuals in them are confronted with localized evidence of the disadvantage they often ascribe to individuals and groups.

Importantly, implicit authorization does not operate as a cue because the source of authorization is not the recipient of the authorization, but rather it extends from an outside entity. Legitimacy that comes by way of authorization is not based on information communicated by an individual for the purpose of influencing performance expectations or status outcomes on their own behalf. Diffuse status characteristics are analogous to authorized pieces of status information because of their presumed collective universal acceptance and serve as the raw material (or “referential beliefs”) for the legitimation (endorsement) of status hierarchies that emerge from them (see also: Ridgeway et al. 1985; Ridgeway and Berger 1986, 1988; Ridgeway 1988, 1991). Further, the more activated referential beliefs that confirm a particular individual “normally” has higher status outside of the group, the more likely it is that group members will expect that that person will in fact have a higher status in the group (Ridgeway et al. 1994; see also: Sev’Er 1989; Fişek et al. 2005; Kalkhoff 2005).

Internal sources of legitimation (endorsement) can however operate and contribute to status outcomes in ways outlined by the cue gestalt component discussed by Fişek et al. (2005). Such information draws its meaning from localized constructs. In this way, nonverbal vocal cues
may signal one’s acceptance or rejection of status claims, or be interpreted as making a new independent claim of the same. Accordingly, the stronger the expectations group members have for certain status outcomes to in fact exist, the more likely it is that they will behave in ways that reflect an acceptance of an informal influence hierarchy that matches their expectations (even when no “real” evidence is available to supports this). When other group members witness such behavior, the effect is often such that it contributes powerfully to each member’s cue gestalt and the appearance of true communal endorsement of the emergent power and prestige order (Berger 1958; Berger and Conner 1974; Berger et al. 1977).

Another related body of theory useful in understanding individuals who seemingly invent information to confirm their expectations for events in which an individual is emitting a particularly potent or frequent status cues, is offered by the psychological literature on cognitive errors such as confirmation bias (Wason 1960) and cognitive heuristics (Tversky and Kahneman 1980). Cognitive heuristics are of particular interest to an examination of status cues. These constructs function as cognitive shortcuts that help individuals choose to locate and use schemas (in this case, those relating to task ability or directly to social status) when they have incomplete information. For example, a representativeness heuristics that is invoked by a particularly salient cue, can make “leader” and “follower” schemas salient to an actor, which are themselves cognitive constructs analogous to the “status typifications” (Berger and Luckmann 1966) discussed by Fişek et al. (2005).²

² For an overview of the cognitive inference processes central to forming impressions of others, see: Moore (2006).

It is possible to understand dominance attempts and deferential behavior as two different outcomes of this process. Dominance is an inherently coercive directive behavior that attempts to
control through direct or implied threat. Such behaviors include acts such as making demands (not requests) of another, or speaking dismissively to another. This makes compliance to domination different from changes in behavior due to competency-based influence. More simply, dominance relates to forced compliance (ordering the adoption of one’s idea/plan) whereas influence relates to a tacit acknowledgement that another’s ideas are likely superior and worthy of acceptance (going along with another who confidently proposes a new idea/plan). Dominance succeeds when it elicits compliance from others based on the perceived capacity of the dominant actor to carry out her threat, rather than perceptions of her ability to make a direct contribution to group’s task (Ridgeway 1984; Ridgeway and Deikema 1989). Predictably, dominance attempts seem to be most effectively wielded by those whom already enjoy high (external – actual or presumed) status. Alternatively, in terms provided by Fişek et al. (2005); it is far easier for consistently-high status cue persons (strong cue gestalt) to succeed in dominating others than it is for those sending mixed messages (weak cue gestalts). Perhaps it is because dominance strategies provide no additional task-related competency information and are likely to reduce one’s likeability, that their repeated use will likely, according to Weber (1968), erode one’s ability to effectively lead.

Legitimacy and gender

“There is no form of human excellence before which we bow with profounder deference than that which appears in a delicate woman…and there is no deformity in human character from which we turn with deeper loathing than from a woman forgetful of her nature, and clamorous for the vocation and rights of men.”

~ Albert T. Bledsoe (1856, p. 224)³

Ridgeway (1997) explains how gender inequality is routinely re-created and reinforced in social interactions by routinized behavior that communicates referential beliefs favoring men. In particular, Ridgeway argues that ideas about generalized competencies favor men and thusly produce performance expectations that favor men in mixed-gender groups. Unless specifically countered and discounted by a legitimate authority, the belief that men are generally more likely to ably contribute to a group’s task can be activated without any deliberate attempt on the part of participants and lead to patterns of unequal expectations, opportunities, status, and performance. Ridgeway argues that these micro-level exchanges aggregate to produce and reproduce macro-level gender inequality.

However Roshotte and Webster (2005) claim that even though gender is salient in the vast majority of social interactions (Ridgeway and Smith-Lovin 1999), researchers have yet to offer empirical evidence that identifies the “subtle mechanisms” that perpetuate gender-based inequalities. While it is not the aim of this dissertation to fill this void, I believe that it is within the scope of this project to comment on this assertion. Specifically, the cue gestalt model offered by Fişek et al. (2005), as elaborated by the “legitimacy gestalt” model I propose above, seems to provide a framework in which referential beliefs about gender competencies and inequalities can be traced to specific interaction rituals. In particular, nonverbal vocal cues and other forms of response may signal deliberate and/or non-deliberate impressions of self and others formed by actors. Because behaviors can be isolated and understood as both (or either) deliberate acts meant to make status claims or acquiesce to the claims of another, and as acts that can signal separate information that correlates certain sex (not gender)-typed states with certain status outcomes, one can link gender typification (with is normatively correlated with sex typification) to status
outcomes separately from willful (or unintentional) like-behavior. This speaks to the existence of a process- and/or social-basis for such inequalities that are beyond the control of individuals.

Martha Foschi (1989, 2000) and others (Foddy and Smithson 1989) have previously offered one “subtle mechanism” when they argued that “stricter standards” exist for individuals in possession of lower diffuse status characteristics when it comes to creating the impression they can competently contribute to the group’s task. If true, I argue that these individuals face more difficulty at achieving position of leadership, in part, to the fact their actions are evaluated more critically and thus they are likely to fail more often to create strong “leader-like” cue gestals.

This argument presents a straightforward alternative to recent work by Peter Burke and colleagues (Burke et al. 2007) who argue that an interaction exists between gender, legitimation processes, and identity verification. Burke et al. (2007) argue that a formally assigned (externally authorized) leaders’ identities are more likely to be validated (by the endorsement behavior of groups members, for example) when these identities are held by individuals with otherwise high status diffuse characteristics. In essence, externally legitimated (authorized) female leaders and male leaders (with no additional external authorization) have a greater likelihood of achieving reactions from their group that match their own self-images as leaders. Interestingly, male leaders with additive external authorization received higher evaluations from their groups than even their own self-evaluations of their behavior.

In the chapters that follow, I discuss research that identifies certain vocal pitch profiles that are typical of “leader-like” speech. Specifically, persons with high vocal pitch variability within a specific frequency band are more likely to be perceived as actively engaged in the group’s task, competent, and subsequently have an advantage to becoming viewed as good
“leader material.” Further, I introduce a new nonverbal vocal indicator of internalized status that functions as a non- or possibly semiconsciously negotiated behavior.

If men are presented with a “lower bar” to clear in the maintenance of strong cue gestalts for leadership, I expect that the additive effect for “high status” vocal cues to be particularly effective for male speakers when present; yet relatively less important to males than females, when absent. Worth noting is that this argument appears to contradict the “inconsistency principle” found in the recent version of status characteristics theory; even though other more recent theoretical work makes no mention of this apparent incongruity (Fişek et al. 2005). In essence, I will offer an alternative argument, that like Burke et al. (2007), suggests that women face greater difficulties convincing others of their competence than do men; and that men in formal position of authority have such “achievement” come too easily. Women are not benefited by such information as much as are men, yet women stand to have their status positions challenged more than men should this information be absent. If true, I expect that like other embedded systemic inequalities, such inequalities will be highly resilient to change. What is important is that the argument developed here offers additional insights into the foundation of these phenomena. However, is seems reasonable to predict that over time, as prominent female leaders increasingly and publicly contribute to our overall community of political, educational, economic, and other culturally-visible forms of leadership, the underlying assumptions of that support this process will erode and gender typifications of leaders and “leader speak” will then shift to a more gender neutral form.
CHAPTER 4
NONVERBAL VOCAL CUES AND STATUS

In chapter 3, I outlined the theory and related evidence suggesting that people actively search for, and use, status cues to make judgments about others’ likely occupation, level of education, intelligence, demeanor, skill at performing specific tasks, and many other factors in an effort to estimate relative social status. An individual’s marshaling of status cues represents an important aspect of self-presentation and provides a basis from which others can infer what the individual will likely contribute to the group’s task (Berger et al. 1977; 1986). Zelditch and Walker (1984) note that legitimacy is indicated by high-ranking members’ ability to command the support necessary to gain compliance with his/her directives – particularly in more formalized status hierarchies. Dominance behavior involves the presumption on the part of the perpetrator that they have the legitimate right to exercise coercive control over others in the situation. The right one believes he possesses to demand compliance from another person presumes the collective support from the local group for this arrangement. Such behavior, if enacted by an individual who also possess a strong higher-status cue gestalt, and if left unchallenged; is likely sufficient to create the impression of localized endorsement of his authority.
Generalized nonverbal cues

Nonverbal cues are of considerable consequence in interpersonal communication. Indeed, there exists ample evidence suggesting that nonverbal cues are often more influential to observers than verbal cues when the two are incongruent (Rosenthal and Jacobson [1966]1992; Burgoon 1994; Burgoon, Buller and Woodall 1996; Gregory and Webster 1996; Burgoon and Le Poire 1999); see also: Argyle et al. 1970; Birdwhistell 1970; and Argyle, Alkema, and Gilmour 1971). Normative nonverbal emotional displays, or the lack thereof, can create unintended effects for cross cultural communication and impression management (Xin 2004 [1997]), profoundly influence an individuals’ trustworthiness (Boone and Buck 2003), and even influence character assessments in ways that may offset stigma and a measure of responsibility after one commits a deviant act (Heise 1989; Robinson, Smith-Lovin, and Tsoudis 1994). Yet, the meanings of many nonverbal cues often vary across situations, thus it is not reasonable to expect to find clear and stable linkages between specific patterns of interruptions, speech rate, etc. that remain true in all contexts. However, some cues are thought to not be so contextually dependent, such as vocal pitch variation and vocal pitch accommodation, making these nonverbal behaviors ideal candidates for analysis.

A great many discrete nonverbal cues have been examined. From Hall’s work on body language, touch, and proximity (Hall 1959, 1966, 1976); to Ekman and Friesen’s (1969, 1975, 1984) work on discrete facial expressions, the research literature is rich with work linking specific sets of cues with imputed emotions and expected outcomes. However, what has yet to be

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4 When used in this context, “cues” are analogous to signs denoting socially meaningful information. This is a less restrictive use than that employed by Fişêk et al. (2005). In this chapter, vocal pitch variation and vocal pitch accommodation are discussed as “cues” in this general context. In subsequent chapters, when vocal pitch accommodation is used to examine the reformulated status cue gestalt theory, it functions as a status behavior (outcome of status processes) and not a “status cue” (evidence pertaining to the possession of a status characteristic).
adequately tested are theories that attempt to explain how such nonverbal vocal cues work together in varied social contexts to bring about social influence and status. In particular, in as much as we live in a culture in which we are constantly bombarded with visual images, we are also persistently being “spoken to” by individuals vying for our attention, consumer dollars, and votes. One of the primary unique qualities of this paper lies not in its focus on a specific aspect of human vocal pitch adaptation, but rather on the clarity it aims to bring to the more general theoretical understanding of nonverbal cues, imputed beliefs about relative status position, and status outcomes.

Nonverbal cues: imputed demeanor, intent, and status

From Tomkins’s (1962) theory predicting that specific negative emotions (anger, fear, sadness, disgust, and possibly others such as shame, embarrassment, and contempt) produce distinct facial signals, Ekman and Friesen’s (1975) work on identifying emotional statues from facial cues, recently revised classification schemes for emotional speech (Ververidis and Kotropoulos 2006), to learning how individuals decode situated meanings from vocal fundamental frequency (as is the goal of his project), researchers have made steady efforts to understand the subtlety of people do fairly automatically and effortlessly in social interaction – make reasonably accurate judgments about our own and others’ attitudes, intentions, and relative status based on nonverbal cues. For example, an apparently calm demeanor may signal to others that one is confident in her ability to perform the task at hand, and/or perhaps that she is at ease with the position of authority and status granted her by the group (regardless of her competence).

Individuals consciously and nonconsciously emit cues that are interpreted, in turn, by others. In addition to information about ones’ self-directed inner feeling, these cues also signal individuals’ apparent acceptance or perhaps rejection of others’ ability or status claims. Further,
all social cues have culturally-defined optimal levels and latitudes of acceptance. Accordingly, any cue can be over or under expressed, sometimes unintentionally, which can result in unexpected consequences. For example, physically handicapped persons often find themselves “victims” of sincere, yet unintentionally overaccommodating others, who may appear patronizing to those they intend to “help” by virtue of their oversmiling, slowed and over-enunciated speech, and exaggerated intonations. Social cues communicate status information by first signaling individuals’ apparent attitudes related to the situation. This information enters the legitimation process as evidence of tacit acceptance or resistance to local status arrangements or information relating to one’s perceived abilities and competencies.

The link between imputed attitudes and intent, and perceived status, is a significant component of the legitimation process because it highlights how influence attempts that incorporate specific nonverbal cues, rely at least in part on the relationship between these cues and the decoding ability (and outcomes) of the receivers. Some recent work examines more direct links between vocal cues and status, by way of occupational categorization, though highlighting the apparent ability of vocal cues to offer information related to the authenticity of individuals claims to work in certain specific occupational fields (Yamada et al. 2000). For a review and metanalysis of research regarding the ability of actors to decode dominance attempts, perceived power, status, and demeanor based on nonverbal behavioral cues involving the face, eyes, head, hands, and voice (including facial behavior, eye gaze, interpersonal distance, body gestures, vocal behaviors, speaking time, and others), see Mast (2002); Schröder (2004), and Hall, Coats, and LeBeau (2005).

While the range of nonverbal cues that may imply one’s status in even a single culture are as of yet, impossibly varied to summarize completely given what we currently know – let alone
for multiple cultures; some physical traits such as height (Wilson 1968), or assumptions about another’s age (Berger et al. 1972; Mazur 1985), have widely been conceptualized as status indicators in sociological research. This means that it is widely believed that certain states of these traits generate the impression that individuals so described are likely to be of certain status. Nonverbal behaviors that achieve influence based on their supposed link to performance capacity or a pre-existing legitimate position (e.g., initiation of, and duration of, initial eye contact; speaking first and/or responding quickly in conversations; choosing to sit at the head of the table, overall speech rate, verbal fluency, relative speaking time, and a “confident” vocal tone (Willard and Strodtbeck 1972; Nemeth and Wachtler 1974; Rosa and Mazur 1979; Lee and Ofshe 1981; Street and Brady 1982; Mast 2002), as opposed to threat capacity (e.g., shouting at, or commanding another; silently staring another down; lunging or otherwise intruding into others “personal space”) are of particular interest to this project as they rely on the tacit acceptance of the communicators’ legitimate status position. For further review of how relational vocal cues may provide indicators of social attractiveness, composure, extroversion, competence, benevolence, warmth, and influence, see Hickson, Stacks, and Moore (2003).

In recent empirical studies examining a wide range of previous research on the ways individuals impute demeanors from nonverbal cues (Johnson 1994; Balkwell and Berger 1996; Walker et al. 1996; Ridgeway 1997, 2000; Rashotte 2001, 2002; Robinson and Smith-Lovin 2001) it is found that nonverbal behaviors are at least as influential as other behaviors in forming complete responses to events, that certain single nonverbal elements can create distinct impressions and convey distinct social meanings, and that certain behaviors can combine in predictable ways to modify impressions of events. Further, Bänziger and Scherer (2005) have shown that situated emotions (affect) can influence vocal pitch contours. It is the promise of this
latest line of work that provides one of the cornerstones for my expectation that it is possible to identify aspects of a “vocal signature” of higher and lower status speech.

**Vocal pitch, amplitude, and other parameters**

When a person speaks, listeners discern meaning not only from the words chosen by the speaker, but also from how those words are spoken. Nonverbal vocal cues, such as pitch, intensity (volume), and speech rate, for example, can sometimes be more consequential to others’ impressions of a speaker than the words she chooses (Ekman and Friesan 1969). Because the nature of nonverbal communication is highly abstract, considerable ambiguity exists about precisely how we should best communicate our own inner feelings to others; as well as how we can best identify the expression of emotions and emotional states in others. While generally more work has been conducted on the function of visually accessible nonverbal cues, such as facial cues and Kinesics, the voice and nonverbal vocal cues clearly play a significant part in social communication. In particular, Scherer (1974) identified eight vocal characteristics as being associated with how emotions are communicated through the voice. In particular interest to this research are Scherer’s findings regarding vocal pitch variation and pitch level. Scherer posits that “moderate” variation in pitch is associated with anger, boredom, disgust, and fear; while “extreme” variation in vocal pitch is associated with pleasantness, activity, happiness, and surprise. Pitch contours that rise at the end of speech utterances indicate potency, anger, fear and surprise; while falling pitch contours indicate pleasantness, boredom, and sadness. Further, an overall high pitch signals activity, potency, anger, fear, and surprise; while generally lower relative pitch indicates pleasantness, boredom, and sadness. In addition, work by Burgoon et al. (1996), Foddy and Riches (2000), and Gregory et al. (2000) suggests that certain acoustic cues
present in the human voice are more influential than these visual cues when observers determine a persons’ social status.

A general consensus of findings suggests that a slightly faster rate and higher pitch variation is usually associated with competent, credible, benevolent, and persuasive speakers; whereas the effects of vocal intensity seems to less clear (Hall 1980, Buller and Burgoon 1986; Buller 2005). Vocal pitch and speech rate, it seems, are of critical importance in most circumstances, even when the effects of other vocal factors such as intensity are ambiguous. For example, a classroom setting, particularly a large lecture hall, is one of the most common places where information conveyed to learners through speech. Research has shown that variations in instructors’ vocalics affect students’ learning outcomes. In particular, Richmond and McCroskey (2000) report that the most fatal error a lecturer can commit is to deliver his address in a monotone voice. Pitch variation and a modestly quick pace appear necessary features of lectures that result in positive learning outcomes.

Further, while there exists some evidence useful for suggesting that the meanings of these limited cues are stable across a range of different cultures (Scherer, Banse, and Wallbott 2001), others have found differences in how this information is interpreted according to the relative social status of speakers and gender differences regarding the influence of “mixed messages” (content) and vocal tone have for male and female speakers/leaders (Laplante and Ambdy 2002). In particular, while Laplante and Ambdy (2002) found that male supervisors were deemed most effective by subordinates when they delivered negative evaluations but used a positive vocal tone; their data suggest that the reverse is true for female supervisors. In fact, positive vocal tone was only effective for men. The researchers speculated that this trend conforms to traditional gender role expectations where women are expected to generally be complementary while men
are expected to be more critical. In essence, female supervisors benefit from sounding more negative as it might increase the salience of their legitimate (in this case, authorized) position, while male supervisors’ image was “softened” when they used a positive tone to deliver negative evaluations such that their criticisms were perhaps perceived less threatening. Regardless of whether this interpretation is correct, it appears from the data that relative social status and the gender of leaders, can affect the way in which some vocal cues are interpreted.

While the research conducted by Scherer (1974) and colleagues provided much of foundation for this valuable work; more recently, some scholars have concluded that the commonly measured characteristics of the human voice (rate, pitch, intensity, and relative speaking time) do not have simple and straight-forward emotional analogues. Recently published empirical research suggests that listeners can judge a speaker’s emotions at rates greater than chance based on hearing only his or her nonverbal vocalizations (Bachorowski 1999). I am encouraged enough by this finding to speculate that because some vocal emotion displays may have specific acoustical correlates, certain internalized beliefs about one’s relative competence, confidence, and status position might also have such “signatures.” However, a more conservative conclusion is that it is not possible to draw a simple set of conclusions from the current body of literature on these correlates, in part due to differences in the procedures researchers have utilized. For a summary of the varied research on the speech correlates of emotional states, see Murry and Arnott (1993) and Buller (2005).

Speech is a highly complex medium. Since even a one-word utterance can carry an emotional quality (Leinonen et al. 1997), it should not be surprising that more complex speech presents opportunity for vastly numerous combinations of acoustic cues (and/or acoustic cues combined with other verbal and nonverbal cues). Most communications researchers agree that
although a certain degree of acoustic differentiation of emotions is possible, these cues alone are insufficient to explain the process used by humans to decode emotion in speech (Sobin and Alpert 1999). What is missing, they and I argue, is contextual information as well as the other social cues that combine to complete the range of cues available to human decoders in social situations. In particular, the social setting in which these cues are emitted is of particular (and seemingly underappreciated) importance. In short, the study of emotional expression requires more than simply “how” one utters something, but rather, it likely requires additional understanding of information relating to where, to whom, by whom, etc.

However, there is some evidence that suggests some acoustic characteristics, such as vocal pitch, are correlated with certain specific affective dimensions of meaning; in particular, activation / arousal (Bachorowski and Owren 1995; Banse and Sherer 1996; and Russell, Bachorowski, and Fernández-Dols 2003). Our perception of vocal pitch is related the fundamental frequency (F₀), also called the first harmonic frequency, of the spoken sound waveform we hear. When viewed on a sound spectrograph, the human voice is revealed as a complex waveform made up of many component sound waves. Fundamental frequency (F₀) refers to the highest common factor of a periodic waveform, measured in hertz (Hz). Put another way, the word “frequency” refers simply to how often something happens in a certain period of time; for example the average number of times a person blinks during a day; and in this case, the frequency we are interested in pertains to the number of glottal vibration cycles (vocal fold vibrations) per second. A single glottal vibration cycle consists of the opening and closing of the glottis (the opening between the vocal folds (“vocal cords”) though which air passes, located in the larynx) during speech. To better illustrate these mechanics, an artistic reproduction of the human larynx is shown here:
The sounds we hear in the human voice are the result of these vibrations. $F_0$ is simply the highest common frequency component shared by all of the various sinusoidal components of a complex waveform.

A recent literature review (Schröder 2004) and meta-analysis (Tisher 1993) focusing on research examining correlations between vocal acoustic parameters and the impressions measured using the Osgood and colleagues’ semantic differential scale dimensions of evaluation, potency and activity (Osgood, Suci, and Tannenbaum 1957; Osgood 1962; Osgood, May, and Miron 1975), conclude that there is no conclusive evidence to link $F_0$ correlates to evaluation.

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5 This image is a reproduction of a lithograph plate depicting a laryngoscopic view of the interior of the human larynx from the 20th U.S. edition of Gray's Anatomy of the Human Body (1918). This image, originally published in 1918, has lapsed into the public domain and is available at: http://www.bartleby.com/107/.
only some mixed evidence linking potency to $F_0$ parameters, and overall, strong and plentiful evidence linking the activation dimension with mean $F_0$. Further, the activation dimension has also been found to correlate with other commonly measured parameters such as mean intensity and speech rate.

However, it is often the case that some of the more basic anticipated relationships between these acoustic parameters are not empirically supported. For example, in a recent study examining the role of these more promising acoustic parameters, evidence surfaced suggesting that speakers’ mean $F_0$, and variation in his $F_0$, influences receiver’s perceptions of their likely level of affection towards the receivers (Floyd and Ray 2003). Yet, while this effect is shown to interact with speakers’ sex, vocal intensity appeared unrelated to perception of affection. In sum, Floyd and Ray (2003) report that higher mean $F_0$ and high pitch variability were interpreted to mean the speaker felt a higher level of affection toward the other; while measures of vocal intensity did not appear to offer stable independent indicators of affection. Further, other recent empirical examinations have found that fundamental frequency contours do appear related to localized speech rate (Trouvain and Barry 2000; Mixdorff and Pfitzinger 2005). In particular, and perhaps as expected, in their work examining arousal/excitement communicated by horse racing commentators, Trouvain and Barry (2000) find considerable positive correlations. By combining Floyd and Ray’s (2003) finding that higher mean $F_0$ creates feelings of positive affect towards the speaker (see also: Scherer 1974; Scherer and Oshinsky 1977) with Bianchi and Lancianese’s (2007) argument that by generating positive affect in a group, a speaker might further benefit from a subsequent increase in status, it is possible to link high mean $F_0$ to status outcomes.

Based on a recent survey of the empirical research literature, an attempt to specifically investigate possible relationships between these factors has not yet been published. It is also
critical to note that research linking fundamental frequency contours and *localized* speech rate do seem to (perhaps unintentionally) overcome one of the troubles with many other efforts to uncover generalized nonverbal vocal behaviors – that interpretations of these rates is *relative* and contextualized. This seems to suggest that the promise of a viable “acoustic signature” of internalized status will likely be fulfilled only by a nonverbal vocal behavior that reflects the *shared* social beliefs about status position in the group and be necessarily interpretable within the context of other “signatures” in the group.

In the next subsection, research by Gregory and Gallagher (2002) is discussed that locates a possible “commanding presence” vocal signature in patterns of high \( F_0 \) variability and the accommodation of others’ voices the speakers’ \( F_0 \) pattern. While the fundamental frequency between 0.0 kHz and 0.5 kHz has been identified as a critical acoustic element in communicating dominance (Gregory and Webster 1996; Gregory, Dagan, and Webster 1997), a specific mean \( F_0 \) within this range has not been identified by researchers as more central than others to the creation of a “commanding presence.” While it is only speculative at this point to suggest that such a specific mean \( F_0 \) might exist, I believe that it is plausible to expect that it does. For the sake of specifying this tentative argument, note first that that Gregory and colleagues work focused near-exclusively on adult men (U.S. Presidential candidates from 1960 – 2000) and to my knowledge there has been no research that has isolated a universal, or sex-typed, mean \( F_0 \) that is interpreted by most listeners to mean that the speaker is confident, competent, and deserving of high status. Such a specific parameter may not exist; but if a universal correlate is found to exist in the “more typically male” (lower) ranges of \( F_0 \) (75 Hz – 150 Hz), it would offer an important clue as to how
males create and maintain male-dominated social exchanges. I argue that more work on this is needed, and given that the Democratic Primaries leading up to the 2008 U.S. Presidential election season were witness to Hillary Clinton’s candidacy, perhaps the time has come to revisit Gregory and Gallagher’s (2002) design with a female candidate in the mix.

Vocal fundamental frequency (F₀) and status

Giles and colleagues’ speech accommodation theory (Giles and Smith 1979; Giles and Coupland 1991; Giles, Coupland, and Coupland 1991) argues that people seek to match their partner’s speech cues, such as accent patterns, response latencies, and utterance durations, in order to gain their approval and affection (for a review, see Buller 2005). To test this theory, Gregory and Webster (1996) examined samples of conversations between televised talk show host Larry King and several celebrity guests that appeared on his program, Larry King Live. They found that King tended to adjust his voice to match those of higher status guests (such as sitting U.S. Presidents), while King’s lower status guests tended to adjust their voices to him. Note that the metric of vocal adjustments is situated in the context of each specific interaction. Vocal accommodation then, is a group-level phenomenon. Specifically, it is important to know who adjusts their voice more to the other(s) in order to determine each individual’s relative vocal accommodation.

Other affects of speakers’ sex, and in some cases, age, are to be expected. Males and females, children and adults, typically produce speech with different pitch ranges. Specifically, the fundamental frequency of adult male speech typically ranges from 75 Hz to 155 Hz (0.085 kHz to 0.155 kHz), adult female’s speech typically ranges from 165 to 255 Hz (0.165 kHz to 0.255 kHz), and the average small child’s voice has a F₀ of 300 Hz (0.3 kHz) (Baken 1987; Kent and Read 2002). This is easily explained by the fact that the physiological structures in the larynx responsible for speech vary according to these factors. These physiological differences result in differences in the capacity for such individuals to typically express a particular mean F₀. This is especially important if we assume that most humans have been socialized into a world where certain groups (e.g., adult males / men), occupy most positions of power and high status. Accordingly, we have been socialized to expect F₀ “signatures” for influential or “commanding” speech to be those more often produced my adult males. Further, if this particular F₀ signature is one that is more easily accessible to adult males, than to all females and to male children; than adult males will have an advantage in a system that is set-up to award expectations for high ability and status to users of this F₀ range.

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The broader research program of Stanford Gregory and colleagues offers evidence that vocal frequency is of fundamental importance to the understanding of vocal adaptation (Gregory 1986, 1990; Gregory et al. 2000); communication effectiveness (Gregory et al. 1993, 1997); and that interview partners adapt the frequencies of their voice to one another over the course of interaction according to their relative perceived social status (Gregory 1994; Gregory and Webster 1996; Gregory and Gallagher 2002; see also: Burgoon, et al. 1996). Most recently, Gregory and Gallagher (2002) have presented evidence gained from a naturalistic study of videotaped presidential debates to support their earlier work. Specifically, they present an acoustic analysis of the fundamental frequency ($F_0$) of the candidates’ voices in nineteen different nationally televised U.S. presidential election debates from 1960 to 2000, and conclude that in six out of eight measured instances, the candidates' non-verbal vocalizations offered a precise metric of their relative dominance (or "commanding presence") in the campaign poll figures at that time of the debates. Further, when this metric was compared statistically with the candidates' final popular vote percentages, they found that it accurately predicted the winner and loser of the popular vote in all of the eight elections considered.

While Gregory and Gallagher were careful to point out this nonverbal vocal cue primarily functions to openly (yet unconsciously) proclaim one’s assumptions about his social status advantage, they do not consider it to be a primary contributor to the forming of status arrangements. However, they do note that in the context of an election involving many under-informed voters who merely watch a few televised speeches and debates, the communication of cues such as these may influence election outcomes by effecting these voters’ beliefs about which candidate is “agreed upon (by the debaters) to be” the more dominant, confident, and strongest Commander in Chief. I believe that these results do confirm the contention that certain
vocal cues could contribute to the perceived status and success of individuals vying for leadership positions in situations where the person who creates the best impression of a commanding and competent leader emerges victorious. Put a different way, their work highlights the need for candidates to sound presidential, in addition to appearing presidential.

Persuasive speech, then, achieves its compelling quality in part from the meanings its delivery creates for listeners. Richmond and McCroskey’s (2000) identification of the “monotone” voice as a “fatal flaw” of instructive speech aligns well with Gregory and Webster’s (1996) work. Indeed, it appears that high variation in the F0 of one’s speech is a key early ingredient to a successful influence attempt. If after hearing such speech, each listener who accords the speaker his endorsement of the speaker’s message and ability to competently contribute it by adjusting his own speech to accommodate that of the speaker, sends an incrementally increasing signal to other group members that the speaker’s authority is legitimate. Similarly, a group member who chooses to not accommodate her speech to that of leader signals her rejection of, or at least ambivalence of, the leader’s status and/or status claim. Further, I believe that there to be stricter standards (Foddy and Smithson 1989; Foschi 1989; Foschi 2000) for individuals of normatively lower social status (e.g., women or racial minorities when this information is salient, such as when working with a formally-subordinate white man) to maintain a consistent high status cue gestalt (Fişek et al. 2005), which creates increased risk to their ability to achieve endorsement (and subsequent identity verification) of their “leader” position (see also: Burke et al. 2007).

This research suggests that specific vocal frequency range utilization may operate as a vocal signature that carries with it status information about the speaker. Leaders who emerge as in initially homogenous task groups will likely be those who initially convey their engagement,
competence, and more generally “fitness” for leadership though the use of certain vocalics; but perhaps more importantly, it is the subordinates that acknowledge an emerging leader’s supremacy by adjusting their vocal F₀ to his or hers, that provide the strongest signal of the groups’ endorsement (Gregory et al. 2000; Gregory and Gallagher 2002). Once a status hierarchy establishes itself in a group, lower status group members are expected to accommodate such higher status group members by adapting the fundamental frequency (F₀) patterns in their vocalizations to those of their leader. Gregory and Gallagher’s (2002) findings suggest that high variability and patterns of accommodation in the range of fundamental frequency between 0.0 kHz and 0.5 kHz, operate as potent status cues; important to determining social status, achieving social influence, and eliciting compliance.

In the chapter than follows, I offer a new conceptualization of vocal F₀ accommodation that can potentially help to offer an alternative explanation for Gregory and Gallagher’s (2002) and Floyd and Ray’s (2003) findings. Vocal F₀ variation can get us part of the way towards a satisfactory explanation, but it is not enough. To be effective, this acoustic parameter must signal not just speakers’ own beliefs in their ability to lead the group (or dyad) to achieve “success” at the task at hand (be it an affectionate encounter or a task situation); but also the tacit agreement about this belief by other(s).

I argue that analyses using vocal F₀ variation assume that individuals who are highly willing (activated) consider themselves to possess high ability at the task at hand (by virtue of these individuals attempting to make many contributions), and that we can understand the high F₀ variability in these individuals’ voices as signals belying their beliefs in their capacity to ably
contribute to the group’s task. Simply put, people who present their ideas with reasonably\(^7\) high levels of \(F_0\) variability, all else being equal, are often judged to be more engaged, competent, and thus likely to illicit vocal accommodation from others and be afforded high status. However, given these assumptions, two questions emerge: Can nonverbal vocal behaviors signal an individual’s relative status beliefs about himself \textit{and} about multiple others (such as in groups larger than dyads)? If so, what nonverbal vocal behavior can discriminate status at the group-level without imposing assumptions of transitivity (see Robinson and Balkwell 1995)?

\(^7\) To reference the “reasonable range of \(F_0\) variation” refers to the presently undefined range of acceptable variation that is set by the larger culture in which the group is embedded. Vocal pitch, like all social cues, has culturally-defined optimal levels and latitudes of acceptance.
CHAPTER 5

APPLYING CUE GESTALT THEORY AND A NEW MEASURE OF STATUS BEHAVIOR

BY WAY OF BEHAVIORAL ENDORSEMENT

In this chapter, I interpret Gregory and colleagues’ empirical findings linking status and F₀ variability (Gregory et al. 2000; Gregory and Gallagher 2002) with the cue gestalt theory model offered by Fişek et al. (2005). Also, I argue that the internalized structure of formal status hierarchies can be ascertained unobtrusively and effectively with vocal F₀ accommodation - much in the same way individuals “naturally” experience the communication of these structures through observation of the nonconscious behavioral adaptations of group members. While the original formulation offered by Fişek et al. (2005) integrates status cues and status characteristics theory, I expand on the function of expressive cues be introducing the concept of “expressive legitimacy cues” to aids in describing the general process of legitimation (endorsement) in the context of this model. I maintain that nonverbal categorical cues dominate the process by which external status characteristics become salient to actors in the first moments of interaction. Specifically, categorical cue gestalts affect the salience of these status characteristics, which in turn, helps determine internal status relations in face-to-face groups by contributing to the general expectation states. Finally, I argue that expressive task cues, such as vocal F₀ variability, appear to contribute to the salience of the auxiliary “apparent competence-incompetence typification” introduced by Fişek et al. (2005).
While remaining consistent with status cue gestalt theory, I emphasize that cues that invoke multiple and consistent referential beliefs (linked to ability or directly to formalized status and/or capacity to exert power), especially in heterogeneous groups with high initial status differentiation (Kalkhoff 2005), have the capacity to create, challenge, or reinforce relevant performance expectations and beliefs about how others will view local status arrangements. Further, some researchers suggest that gender affects the way such information is evaluated (Foddy and Smithson 1989; Foschi 1989, 2000). Accordingly, it is appropriate to expect that status cues, status characteristics, the general process of legitimation, and status outcomes are interdependent, socially managed, and subject to the effects of gender norms, and gendered forms of talk and interaction (Ridgeway et al. 1985; Ridgeway and Berger 1986, 1988; Ridgeway 1988; Ridgeway and Erickson 2000; Foschi 2000; Johnson et al. 2006).

F₀ variability as a status cue, F₀ accommodation as status behavior and endorsement

Speech that is interesting and “exudes confidence” captures and holds one’s attention while communicating that the speaker believes she "knows what she is talking about.” The recent research program of Gregory and colleagues (Gregory et al. 2000; Gregory and Gallagher 2002) offers evidence that suggests speech that is highly variable in the F₀ range is perceived in this way. Further, when a subordinate accommodates his supervisor by adjusting his vocal pitch to the changes in pitch made by the supervisor, he tacitly signals his endorsement of her position. I assume that one of the effects of participation in formal organizations is that individuals come to expect that those who routinely dominate face-to-face interactions by speaking in confident tones, speaking first and more often, generally “set the tone” instead of adjusting to the tone of others, and more frequently interrupting others; generally already enjoy legitimated high status positions and are believed to “know what they are doing.” Such is the way that localized vocal
behavior can be imbued with meaning from the larger culture to serve as the basis for others’ beliefs about a speaker’s competence (Ridgeway and Berger 1986, 1988; Ridgeway 1988). By creating this impression, vocal F₀ accommodation to a group’s leader serves to enhance the salience and validity of the apparent competence-incompetence typification already present in formalized leader-subordinate type groups; which in turn, provides behavioral endorsement of the group’s status structure. Because this behavior reflects group members’ beliefs about the operational status structure, and because it can be observed to ascertain relative status difference between individual group members, it is therefore is a direct behavioral measure of status difference.

So, can changes in vocal pitch contribute to status outcomes in social interaction? I believe that the answer is a *qualified*, “Yes,” since it largely depends on contextual and other factors. What is fairly certain is that humans have evolved to communicate using a wide range of signals; many of which indicate dominance and deference behavior that contribute to status outcomes. While vocal signals are not *necessary* to convey such information, when they used in the right sequence, vocal signals appear *sufficient* in some circumstances to serve as powerful indicators of status. An acoustic parameter, or “vocal signature,” that seems to infer meaningful status information by way of signaling activation, confidence, competence, as well as relative status, has been outlined in the previous chapter. Specifically, controlling the prevailing vocal pitch pattern in a conversation marks someone as higher status, and accommodating one’s speech to that of another, signals one’s endorsement of the other’s superior status. Of course a leader’s control over vocal pitch can only be realized when other group members change their vocal behavior to match the leader’s voice. Thus, the metric of vocal F₀ accommodation is necessarily
socially constructed, relative, directional, and valid – in as much as it is a direct measure of
deerence/dominance behavior.

Vocal F₀ accommodation in interaction affords researchers an unobtrusive and non-zero-
sum measure of deference behavior. Specifically, unlike other common ratio-level measures of
deerence and status where each group member is ranked according to their “share” in the display
of a finite cue or control over a resource, vocal F₀ accommodation is a socially-negotiated
individual behavior that is continuously interpreted relative to each group members’ behavior, as
well as the individuals’ previous vocalizations. As such, multiple group members can, for
example, simultaneously signal endorsement of a leader without creating status division between
them. In the next chapter, I examine three-person same- and mixed-gender groups characterized
by manipulated formal status and legitimacy to determine the effectiveness of vocal F₀
accommodation at describing these status structures as predicted by status characteristics theory.

Cue gestalt theory

The modifications to cue gestalt theory involve five key ideas. I will begin by discussing
these generally, and then I will expand upon several of the critical areas. The first four are largely
consistent with the theory proposed by Fişek et al. (2005), while the fifth integrates expressive
legitimation cues and expands the operation of cue gestalts. This first idea is that status cues
merely signal, or indicate, status elements such as status characteristics, but they do not function
as status characteristics themselves. An earlier review of the empirical literature on status cues by
Berger et al. (1986) resulted in two empirical generalizations the function of task cues. The
second abstract generalization is that in groups of individuals with no salient initial differences in
status characteristics (homogenous groups), differences in observed task cues will produce status
difference by leading to the formation of performance expectations for self and others(s). Fişek et al. (2005) conclude that this first generalization holds true for both task and categorical cues.

The third abstract generalization given by Berger et al. (1986) is that in situations where group members are initially discriminated by diffuse status characteristics (heterogeneous groups), these differences will produce corresponding differences in performance expectations, which in turn generate parallel displays of task cues. Specifically, that task cues follow the power and prestige order just as do other status behaviors, such as the giving and receiving of action opportunities. Thus, task cues can operate both as “input” information to situations and as “output” information from embedded actors responding to dynamic status organizing processes in the group.

The fourth idea is that status cues typically operate in clusters of varying degrees of internal consistency. These clusters are called cue gestalts. While single status cues are sometimes intense or frequently occurring enough to seemingly exercise their effect independently, I argue that this is not the case. Similarly, Fişek et al. (2005) argue that while research by Ridgeway (1987) appears to show that a singly-manipulated status cue can affect status outcomes; the reason this occurs is that this type of cue “…activates other cues which are usually associated with it, and is enough to create the necessary cue gestalt by itself (2005:85).” Yet, Fişek and associates do not specify the process by which these “supporting” cues become salient.

I argue that especially intense or frequently occurring single task cues, invoke additional status cues, real or imagined, in order to help observers “complete the picture” that normatively accompanies such task cues. Thus, task cues never operate alone since even in the absence of other “real” supporting data, individuals cognitively complete cue gestalt for particularly salient
cue (absent contradictory others). From a cognitive psychological perspective, one way we can understand behavior in which information is seemingly invented to confirm cues gestalts for individuals emitting particularly potent or frequent isolated cues, is to consider it resulting from a cognitive error such as confirmation bias (Wason 1960) or the reliance on particular cognitive heuristics (Tversky and Kahneman 1980) (for a review cognitive inference processes, see Moore (2006)). For example, a representativeness heuristics that is invoked by a particularly salient cue, can make “leader” and “follower” schemas salient to an actor, which are themselves cognitive constructs analogous to the “status typifications” (Berger and Luckmann 1966) discussed by Fişek et al. (2005). Such processes seem to be implicitly incorporated in the core of status characteristics theory; namely the “burden of proof” and “sequence of structure completion” assumptions (see Appendix A for a detailed account).” Finally, a related question that is raised by this line of reasoning is how potent, or how frequent is “potent or frequent enough” for a cue to initiate the manufacture of a complementary cue gestalt? The answer to this question will require a great deal of investigation that is sensitive to the variability in both cues and contexts. However, I believe it is an investigation worthy of future research. In absence of a complete understanding of these thresholds, researchers have empirically confirmed that cues that invoke multiple and consistent referential beliefs can be quote powerful, especially in groups with high initial status differentiation (Kalkhoff 2005).

Cue gestalts occur in two forms. Strong cue gestalts are sets of like-meaning cues that, in the words of Fişek et al. (2005), “leave no room for doubt that the actor does possess the status element they indicate.” Thus, when an actor exhibits a strong cue gestalt, the relevant status characteristic is identified and becomes salient (as long as it meets the general requirements for salience: it is (a) relevant to the task and it (b) can be used to discriminate actors based their
possession/non-possession of it). Weak cue gestalts do not provide such definitive identifying information. A weak cue gestalt is a set of status cues that provides enough information so that the actor is “given the benefit of the doubt” that he probably possesses the relevant status element. Accordingly, the effect of a weak cue gestalt is less than that of a strong cue gestalt; since strong cue gestalts indicate direct possession of a status characteristic. Even minor contradictory evidence can disrupt weak cues gestalts and result in an ambiguous set of cues that forms no gestalt at all.

Definition: A **strong cue gestalt** is a set of status cues, emitted by an actor, that indicates he does possess the relevant status element.

Definition: A **weak cue gestalt** is a set of status cues, emitted by an actor, that indicates he probably possesses the relevant status element.

Next, it is necessary to explicitly define the different types of cues that contribute to cue gestalts. Categorical cues can be separated from task cues and both types of cues have indicative and expressive forms. Categorical cues give information about whether actors possess diffuse or specific status characteristics. The larger the number of consistent categorical cues an actor displays, the more likely they will form a strong cue gestalt. However, categorical indicative cues work differently than categorical expressive cues.

**Categorical cues**

In explicating the handling of status cues in the expectation states theory literature, Fișek et al. (2005) argue that *categorical indicative cues* are the fundamental basis for status claims; such that a single credible and unchallenged categorical indicative cue is sufficient to create a strong cue gestalt for a status characteristic. For example, if an individual's claims, “I am a professor,” her claim will be accepted long as there is no information available that contradicts her. **Categorical expressive cues**, however, operate differently. Consistent sets of these cues are
generally necessary to generate strong cue gestalts, even if they represent the only information available. It is possible for a single highly potent or frequently occurring categorical expressive cue to create a strong cue gestalt, but because expressive cues vary in intensity, demarking the degree to which specific individual cues will be sufficient to independently create a strong cue gestalt is difficult, since it is likely to be culturally and context-specific to that cue.

The fifth idea presented here is that I argue that vocal F0 accommodation can serve as a direct indicator of internalized status structures and also as an additional cue capable of informing outside or tangential observers about the degree of legitimacy a groups’ status structure enjoys from the perspective of its members (contributing to, in essence, a “legitimacy gestalt”). Specifically, such observers might accurately ascertain the status hierarchy of a group by simply observing the action-opportunity sequence and/or stay [P(S)] behaviors; yet information as to the degree to which individual actors in the situation view these status arrangements as legitimate is not available from an assessment of these behaviors alone. What is required is a behavioral indicator that signals actors’ nonconscious endorsement of the group’s structure in a way that also independently describes the specific structure that they endorse. Vocal F0 accommodation fits this bill as it can function both as a short-hand way to make accurate judgments about a group’s status structure, and about the degree of endorsement this structure enjoys. The term I give to this type of information is a *categorical expressive legitimacy cue*.

**Definition:** A *categorical expressive legitimacy cue* is an expressive cue that indicates a sender’s nonconscious beliefs about his status position relative to the other(s) with whom he is engaged.

For example, after a group’s status structure emerges and group members proceed to work on their task, their subsequent social interactions contain new information that signal the
leader’s beliefs, as well as others’ beliefs, about the legitimacy of the claims that have “earned” each individual his or her position in the groups’ power and prestige order. However, these cues occur after the status structure has emerged and are generally in response to it. Accordingly, (categorical) expressive legitimation cues are typically associated with the status positions and relationships generated by status characteristics, not individual status characteristics. For example, an outside observer preparing to join a group who has the opportunity to first listen to a short interaction sequence between the group members is likely to gain a sense of the operational status arrangement of the group without knowing anything further about the formal status hierarchy. This information contributes to the outsider’s expectation states for the group members because it is likely to be interpreted as salient and legitimate discriminatory information about each group member. For this outsider only, the most appropriate place to model the “fit” of expressive legitimacy cues in a situational graph structure is in the same position that categorical expressive cues operate (e.g., contributing to actors’ overall cue gestalt). As such, since a weak cue gestalt results from a strong cue gestalt that has been compromised by inconsistent information, expressive legitimacy cues are typically not independently influential unless they indicate inconsistent patterns of implicit status beliefs. While Fişek et al. (2005) characterize status cues as information emitted by an actor, about that actor; I instead point to another unique feature of expressive legitimacy cues – that they necessarily infer information about the relationship between actors.

Expressive cues have meanings that are uniquely social; in that they are often created in the context of ongoing interaction. These cues can carry information about beliefs in one’s self and others’ status based on task-related competencies, links to external sources of legitimation; or power based on implicit threat capacity (legitimate or otherwise). In doing so, expressive cues
contribute to the general legitimation process of behavioral endorsement by relaying members’ apparent beliefs about the legitimacy of the group’s status arrangement. If such communication is not regular and patterned according to normative proscriptions, it can even create negative outcomes for the emitter. Specifically, Youngreen and Moore (2008) in their test of Wager’s (1988) theory of moral characteristics, argue that certain forms of behavior that signal disagreement with prevailing status arrangements can “backfire” on an actor. Actors who are perceived as repeat violators of the normative interaction protocols for their position vis-à-vis higher and/or lower status others in the group may be assigned a negative state of the moral characteristic and be viewed as a “status violator.” Note that the deviant behavior must be sufficient in frequency and duration to appear a pattern before it generates this stigma. Work of this type highlights the importance of expressive legitimation cues, and the meanings they infer.

As noted by Fişek et al. (2005), expressive cues are variable in intensity and frequency. I argue that vocal F₀ accommodation is an expression of dominance and submission behavior in established groups. The terms “accommodation,” “responsiveness,” “coordination,” and sometimes “adjustment,” are often used interchangeably in the research literature on interpersonal communication. While these terms share several interpretations, accommodation, or more specifically, to accommodate, is used in this paper to mean an adjustment of behavior towards, or to match, the behavior of another. Vocal F₀ accommodation, then, is the adjustment of one’s vocal F₀ pattern to the pattern expressed by another actor. Typically, even individuals of varying status vocally converge towards one another (Gregory et al. 1993); however, vocal accommodation focuses on “who does the most ‘work.’”
Task cues

Unlike categorical cues, task cues do not refer directly to status characteristics, but rather to *status typifications* (Berger and Luckmann 1966; Fişek et al. 1991; Fişek et al. 2005).

Status typifications are classifications of behaviors into differentially evaluated types or states. Status typifications are abstract conceptions of what high and low status behaviors are like, and are socially constructed. Dual terms like ‘leader–follower,’ ‘initiator–reactor’ are examples of different concrete expressions of these abstract constructions. We represent the two typification states as B(+) and B(-). Typification states are relevant to states of abstract task ability, which are induced elements in the theory of status characteristics and expectation states (Fişek et al., 1991:118).

Fişek and associates (2005) argue that regardless of whether strong task (only) cues gestalts or weak task (only) cue gestalts are generated by actors, an apparent competence-incompetence typification state will be activated for each actor. These typifications will thus be relevant to assessments of abstract task ability y(±), which are relevant to like-signed task outcome states. Thus, task cues generate information that infers differences in the general problem-solving, and task-related, abilities of actors. Further, task cues can create cue gestalts, without additional categorical cues. As with categorical cues, especially strong task cues can independently create like-signed strong cue gestalts and clusters of less potent task cues can create like-signed weak cue gestalts. The assumption referring to the operation of task cues in relation to the salience of the “apparent competence–incompetence” typification, as presented by Fişek et al. 2005:89), follows:

Given that an actor emits or displays a gestalt of task cues, the apparent competence typification, B(±), will become activated and become relevant to abstract task ability, y(±), and

1. if the cue gestalt is strong then the actor will be seen as possessing the state of the typification with the sign of the cue gestalt,

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8 This quote also appears in Fişek et al. (2005:88).
2. if the cue gestalt is weak then the actor will be seen as possessing the weak cue gestalt, \((\alpha\pm)\), which will be relevant to the state of the typification of the same sign.

A critical feature of the apparent competence-incompetence typification (or other typifications) is that it does not operate in the inherently symmetrical (zero-sum) fashion typical of status characteristics. Specifically, actors do not interpret competence-incompetence typifications to all actors when a specific state is assigned to a particular actor. In other words, an actor who believes another as possessing a negatively-evaluated apparent competence-incompetence typification, does not necessarily consider him- or herself as possessing a more positive competence-incompetence typification. Thus, an adequate test of status cue gestalt theory must use empirical measures that also possess this quality.

Task cues can be differentiated into indicative and expressive forms. As with categorical indicative cues, a single uncontested task indicative cue is likely sufficient to generate a like-signed strong cue gestalt and subsequent apparent status typification. For example, if an individual claims, “I am an expert at this task,” and there is no contradictory information available, it is likely that others will accept this information and view him as possessing a positive apparent competence-incompetence status typification.

Consistent sets of task expressive cues can create strong cue gestalts; so too can a single highly potent or frequently occurring task expressive cue. Task expressive cues operate according to the parameters of expressive cues, as described above.

Auxiliary assumption: Vocal F₀ variation operates as a task expressive cue.

The voices of charismatic and effective leaders are critical in communicating such speakers’ apparent authority and (task) ability. People want to listen and take direction from those whose
voices command such respect. In other words, people who present their ideas with reasonably\(^9\) high levels of F\(_0\) variability, all else being equal, are often judged to be more engaged, competent, and thus likely to illicit vocal accommodation from others and be afforded high status. Because of the preponderance of empirical work linking the vocal parameter of high F\(_0\) variation to engaged and credible speakers, I argue that F\(_0\) variation operates as a task expressive cue. Given the only moderate evidence identifying F\(_0\) variation as a correlate of engaging competent speech (as opposed to irritated speech, or other forms of highly active but negatively-evaluated speech), I do not expect that high F\(_0\) variation is generally independently potent enough to create strong cue gestalt for an apparent competence-incompetence typification. I do, however, expect it will affect status outcomes by contributing to relevant weak cue gestals.

In summary, the criteria for the determination of status cue gestals\(^10\) offered by Fišek et al. (2005:90-91), as modified to include the criteria for categorical expressive legitimation cues, are as follows:

1. A consistent set of cues, regardless of type, generates a strong cue gestalt.
2. An inconsistent set of cues with a predominant subset generates a weak cue gestalt.
3. An inconsistent set of cues without a predominant subset does not generate a cue gestalt.
4. A single categorical cue that is inconsistent with existing cues, will affect an actor's possession of a diffuse status characteristic more than an additional consistent cue, as long as they are equally potent.\(^11\)

\(^9\)To reference the “reasonable range of F\(_0\) variation” refers to the presently undefined range of acceptable variation that is set by the larger culture in which the group is embedded. Vocal pitch, like all social cues, has culturally-defined optimal levels and latitudes of acceptance.

\(^10\)I add the simplifying assumptions from Fišek et al. (2005) that all status cues are salient and accessible to all actors, and each status cue is equally “important.”

\(^11\)According to the “attenuation principle” (see: Berger et al. 1977; Fišek et al. 1991; Roshotte and Smith-Lovin 1997; and Foddy and Riches 2000).
5. A single indicative cue, whether task, or categorical, generates a strong cue gestalt.

6. A single expressive categorical cue, if sufficiently intense, generates a strong cue gestalt; and a single expressive task cue, if sufficiently frequent, generates a strong cue gestalt. Otherwise, such cues generate weak cue gestalts if not contradicted by other information.

7. A single expressive legitimation cue, if sufficiently intense or frequent, contributes to adjustment of expectation states in ongoing interactions as an expressive categorical cue.

Another related line of research that offers an explanation for these findings highlights the “attenuation principle” from status characteristics theory. Specifically, Roshotte and Smith-Lovin (1997) find weak support for the arguments set forth by Berger et al. (1977) and Fişek et al. (1991) over those offered by Skvoretz and Fararo (1996) with regard to the relationship between status cues and diffuse status characteristics. Specifically, that additional high-status task cues have more impact for individuals with low diffuse status than for individuals with high diffuse status (also see: Foddy and Riches 2000). These findings contribute to the evidence suggesting that cue gestalts are aggregated similarly to status elements.

The modified cue gestalt theory presented here preserves the central framework offered by Fişek et al. (2005) while integrating the processes of expressive endorsement. Figure 5.1 shows a model for understanding status behavior based on these new arguments.
I argue that analytically separating the set of task cues from the set of categorical cues provides a more accurate understanding of how legitimacy and legitimation are achieved through these separate, but interrelated processes. In the next chapter, I outline an empirical validation of F₀ accommodation as a new unobtrusive non-verbal vocal measure of internalized status and collective validation.
CHAPTER 6
METHODS

Gregory and Gallagher’s (2002) findings suggest that high variability and patterns of accommodation in the range of fundamental frequency between 0.0 kHz and 0.5 kHz, operate as potent status cues; important to determining social status, achieving social influence, and eliciting compliance. In light of these empirical findings and my theoretical integration of status cue gestalt theory and legitimation theory, I believe that vocal F₀ variation operates as a task expressive cue and vocal F₀ accommodation serves as a behavioral indicator of internalized status relations that also operates as an expressive legitimacy cue to external observers. Accordingly, I expect future empirical investigations to find that in more controlled, yet still “naturalistic situations,” the F₀ of speech perceived as especially authoritative will be more varied, and that individuals will adapt their vocal F₀ towards the vocal F₀ of higher status group members. In the study, however, I will focus only on validating vocal F₀ accommodation.

This project uses previously collected group interaction data in which seventy-one three-person groups of undergraduate men and women participated in a twenty-minute task-orientated team discussion (Robinson and Ten Eyck 1999). In a design adapted from Johnson (1993), participants believed that they had been hired to form a temporary mock organization (an advertising team), with the goal to write a radio commercial to recruit out-of-state students to their large, Southern United States, public university. At the onset of the study, participants were assigned to specific roles to play in the organization. In each group, two people of the same
gender were each assigned to the role of "Assistant" and a single man or woman was assigned to the role of "Supervisor." All groups completed the same task.

Participants volunteered for a study on social creativity. Upon arrival, all participants completed a pre-test questionnaire that asked about grade history, work history, and other leadership positions. The questionnaire also contained a brief creativity measure. An experimenter collected the completed questionnaires, and left the room for a few minutes. Upon returning, the experimenter explained that past research indicated that the task they would be working on together would benefit if the group had a good leader. In half of the groups, the experimenter went on to say that, “Of course, we have no way of knowing which of you would make the best leader, so we have randomly assigned _______ to be the Supervisor, and _______ and _______ to be Assistants.” This was the low legitimacy manipulation. At this point, the experimenter handed badges to the participants and escorted them into the New Ideas Advertising, Inc “board room” that would serve as the site for the rest of the experiment. In the high legitimacy condition, after the same initial explanation above, the experimenter went on to say that, “Therefore, we have assigned _______ to be Supervisor for this group and _______ and _______ to be Assistants.” Without explaining why, the experimenter told that the group that _______ [the assigned supervisor] was the best suited for the job.

To reinforce their assigned roles and the situational context, Supervisors and Assistants were given different “Supervisor” or “Assistant” badges, seated at role-labeled chairs in the "board room", and worked from separate "Supervisor's Manual" and "Assistant's Manual" instruction booklets, respectively. The content of the Supervisor's Manual and the Assistant's Manual differed only in that the Supervisor's Manual informed them that their job was to ensure that their team wrote the best possible commercial and the Assistant's Manual informed them that
they were to assist their Supervisor in creating the best possible commercial. Further, all experimental materials, including a sign affixed to the board room door, scratch paper, ad copy paper, and a sample radio commercial script, were emblazoned with the *New Ideas* mock company logo.

Once in the boardroom, participants were seated in pre-designated positions (by Supervisor and Assistant roles) around a circular table. Three separate 8mm video cameras that would independently record the groups’ discussion were trained on each participant. While helping the participants get properly situated, the Experimenter ensured that all cameras were functioning. Before leaving the room, the Experimenter reminded the group that they would be given twenty minutes to write the text for their brief radio commercial and then she set a digital timer on the table that would count-down the time remaining and signal the end of their session with an alarm.

The period within which participants’ vocal $F_0$ data was analyzed began immediately after the Experimenter left the room. This audio (only) and audio/video data (recorded on 8mm videotapes) was later converted to digital format (WAV and MPEG2 files, respectively). In the following section, I outline the procedure for capturing each participant’s acoustic data from these taped conversations. Afterwards, I explain the procedures used to analyze these data in conjunction with other data gathered from these conversations. After the twenty minutes expired and the alarm sounded, the Experimenter re-entered the board room and the participants were then escorted to separate locations where they were asked to complete a post-task questionnaire containing questions about self and other participants.

According to status characteristics theory, I may assume gender will operate as an active salient diffuse status characteristic in the mixed-gender groups; with “men” possessing the higher
(+ state and “women” possessing the lower (-) state. In addition, I assume the formal assignment of the “Supervisor,” “Assistant 1,” and “Assistant 2” positions will produce active salient specific status characteristics; with Supervisors possessing the higher state (+) and Assistants possessing the lower (-) state. Also, the assignment of the Supervisor and Assistant positions occurred under conditions of either high or low externally-granted legitimacy (authorization). In the high legitimacy condition, assignments were purportedly based on results from a pre-test inventory portrayed to be a good predictor of leadership ability. In the low legitimacy condition, participants were informed that the pre-test results did not contribute to the assignment of the Supervisor and Assistant roles, but rather the assignment was random. Thus, in the more potent legitimacy condition, the Supervisor and Assistant positions were assigned according to apparent leadership ability to reinforce these assignments.

I believe the authorization (externally-located legitimacy) of Supervisors, and consequently the formal status structure, in the high legitimacy conditions contributes to the reinforcement of the Supervisors’ formal status as a strong task indicative cue. To members of these groups, the Experimenter’s claim to have awarded the Supervisor position to the person who scored highest on a test predictive of leadership ability reinforces the “leader-follower typification” already established by the formal assignment of “Supervisor” and “Assistant” roles (categorical indicative cues), and contributes to a strong cue gestalt for the Supervisor. In the low legitimacy conditions, formal positions are known by the participants to have been randomly assigned, so I expect the communication of this fact to operate as an additional weak categorical indicative cue (relying on validity, not propriety (Dornbusch and Scott 1975)); contributing to these Supervisors’ relatively weaker cue gestalts. In total, this 2x2x2 model combines gender (man or women), formal role assignment (Supervisor or Assistant), and the degree of externally-
located legitimacy (authorization) of these role assignments (high or low), to produce groups with specific status structures for assessment using vocal F₀ accommodation.

(A)

\[ p \quad D_{(+)} \quad \Gamma_{(+)} \quad C_{(+)}^{*} \quad T_{(+)} \]

\[ \text{(-)} \]

\[ o \quad D_{(-)} \quad \Gamma_{(-)} \quad C_{(-)}^{*} \quad T_{(-)} \]

(B)

\[ p \quad C_{(+)} \quad \tau_{(+)} \quad Y_{(+)} \quad T_{(+)} \]

\[ \alpha_{(-)} \]

\[ o \quad C_{(-)} \quad \tau_{(-)} \quad Y_{(-)} \quad T_{(-)} \]

\[ B_{(-)} \quad \gamma_{(-)} \]

Figure 6.1: Situational graph structures depicting groups discriminated by: (A) gender: male (p) and female (o), and (B) formal position: Supervisor (p) and Assistant (o), with an additional path for low Supervisor legitimacy.¹²

Figure 6.1 depicts two simple S-graphs. The first (A) shows two actors discriminated by a diffuse status characteristic (gender) that is not specifically related to the task, but infers general

¹² Both Assistants in all groups are identical in status to each other.
ability and competence. This S-graph can be used to model the effects of gender in mixed-gender groups. This figure also depicts a second S-graph (B) that shows two actors discriminated by a specific status characteristic (formal position) that is not explicitly related to the task but provides for the basis of presumed generalized problem solving ability. Also, a path is added (dashed line) to illustrate a situation where a Supervisor who would otherwise have a strong expectation advantage due to his general association with positive task outcomes (burden of proof process), has a weak negative task cue gestalt due to the low legitimacy of his position.

These figures may be used together to illustrate situations where actors \((p)\) and \((o)\) discriminated based on a single diffuse status characteristic, a single specific characteristic, and the legitimacy of the role assignment (as it pertains to task competency). Specifically, in same-gender groups with high legitimacy Supervisors, actor \(p\) has two positive paths, one 4-length and one 5-length.\(^{13}\) Actor \(o\) has the opposite: two negative paths, one 4-length and one 5-length. In same-gender groups with low legitimacy Supervisors, the path outcomes for actors \(p\) and \(o\) are identical except that actor \(p\) has one additional negative path (4-length). Finally, in mixed-gender groups, men have an additional two positive paths (one 4-length and one 5-length), while women have an additional two negative paths of the same lengths.

These path outcomes lead to the relative expectation advantages and predicted ranking of status behavior differences that are shown in Table 6.1 (the group with the highest status differential between Supervisors and Assistants is listed first; the remaining groups are listed in descending order of magnitude).\(^{14}\):

---

\(^{13}\) To simplify the interpretation of these models, actor \(p\) is considered the “Supervisor” by default.

\(^{14}\) I use the path values obtained by Fişek et al. (1992) which are \((0.1358, 0.0542, \text{ and } 0.0211)\) for path lengths 4 through 6, respectively.
Table 6.1: Ranked Degree of Expected Status Difference by Gender, Position, and Legitimacy.

<table>
<thead>
<tr>
<th>Rank in Degree of Status Difference</th>
<th>Supervisor Gender</th>
<th>Assistant(s) Gender*</th>
<th>Legitimacy</th>
<th>Supervisor’s Expectation Advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Man</td>
<td>Woman</td>
<td>High</td>
<td>0.6638</td>
</tr>
<tr>
<td>2</td>
<td>Man</td>
<td>Woman</td>
<td>Low</td>
<td>0.5280</td>
</tr>
<tr>
<td>3</td>
<td>Man</td>
<td>Man</td>
<td>High</td>
<td>0.3652</td>
</tr>
<tr>
<td>**</td>
<td>Woman</td>
<td>Man</td>
<td>High</td>
<td>0.3652</td>
</tr>
<tr>
<td>4</td>
<td>Man</td>
<td>Man</td>
<td>Low</td>
<td>0.2294</td>
</tr>
<tr>
<td>**</td>
<td>Woman</td>
<td>Woman</td>
<td>Low</td>
<td>0.2294</td>
</tr>
<tr>
<td>5</td>
<td>Woman</td>
<td>Man</td>
<td>High</td>
<td>0.0000</td>
</tr>
<tr>
<td>6</td>
<td>Woman</td>
<td>Man</td>
<td>Low</td>
<td>-0.1358</td>
</tr>
</tbody>
</table>

*a* All groups contained two Assistants, each of the same gender.

*b* No difference in status behavior (vocal F₀ accommodation) is expected between this and the preceding group.

Gender (man/woman), followed by formal status assignment (Supervisor/Assistant), then legitimacy (high/low) will contribute to status differences in this order of decreasing magnitude. Specifically, I predict that men supervising women in high and low legitimacy conditions will create the highest (first) and next (second) highest status differentials, respectively. Same-gender groups with like legitimacy will produce indistinguishable vocal F₀ accommodation differences; and of these, groups with high legitimacy Supervisors will produce higher status behavior differentials (third) than same-gender groups with low legitimacy Supervisors (fourth). Women supervising men in high and then low legitimacy conditions will produce the next (fifth) and least (sixth) highest status differentials, respectively.

Measuring vocal F₀ using PRAAT

To measure the fundamental frequency of each participant’s speech in the context of their social interaction it is necessary to first extract audio (WAV) files from the 8mm videotapes. This process involves converting the 8mm videotape recordings to digital audio/video (.avi) files and
then further extracting the audio only (WAV) files for analysis. To accomplish this conversion, *Videowave III* software was used in conjunction with an 8mm digital video camera/player. Because the raw .avi files were prohibitively large to store and analyze with the equipment available to the research team, *MPEG2* (audio/video) files were also created from the larger .avi files to provide a more manageable archive of each audio/video sample.\(^{15}\)

The analysis begins with the identification, and isolation, of each participant’s voice. To accomplish this, a trained rater creates and then carefully listens to a series of sequenced thirty-second audio recordings from each group while simultaneously observing a synchronized video recording of that group to ensure the positive identification of each speaker. In order to obtain the vocal frequencies of each subject, these audio recordings are then separated into smaller, ten-second recordings, called slices, from the first three minutes of conversation occurring after the experimenter left the room.\(^{16}\) The rater then identifies the portions of the slice that contained only the target speaker’s voice. Once armed with this information, the rater uses features of the *PRAAT* program (Boersma and Weenink 2005) to capture the mean fundamental frequencies for each speaker’s utterances.\(^{17}\)

The processing of lengthy voice samples is tedious. Like most other software geared towards acoustic analysis that was available at the time of this study, *PRATT* is typically used to analyze sound files of much shorter duration than those in these analyses. The figure below

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\(^{15}\) This data was processed at an audio sample rate of 48.0 kHz, in 16-Bit Stereo (16.00 KB/second).

\(^{16}\) Using previous empirical research as my guide (Fişek 1969), I decided to examine only the first three minutes of conversation after the supervisor left the room because I believed that this portion of interaction likely bore witness to both the establishment of the initial power and prestige order, as well as the subsequent reactions of groups’ members to their ongoing interactions in light of this opening formation.

\(^{17}\) The settings for *PRAAT* were standard for optimized voice analysis: silence threshold = 0.03; voicing threshold = 0.45; octave cost = 0.01; octave jump cost = 0.35; voiced/unvoiced cost = 0.14; pitch range = 75.0 – 500.0 Hz.
illustrates the spectral analysis interface used by the rater to select the audio slices (maximum duration of 10.0 seconds).

![Audio Slice Capture Screen](image)

Figure 6.2: Audio Slice Capture Screen.

Figure 6.2 shows 30.0 seconds of audio data from the audio file for “Assistant 1 in group 104” and the 9.328 seconds slice that has been selected for analysis. Once selected, PRAAT is used to measure and record the F₀ data. The spectrogram shown in Figure 6.3 (below) is of a single slice of an utterance 1.116 seconds in duration. In the lower portion of the display are horizontal tracks (in red) indicating ordered harmonics (F₁, F₂, F₃…), and instances where the sound data is sufficient to calculate fundamental frequency (F₀) in blue.
Assessing status behavior with vocal F₀ accommodation

In addition to vocal F₀ accommodation, I utilized data from the post-task questionnaires. These data include measures of Supervisors’ status, leadership, and a composite of these two general concepts. Specifically, an index containing the aggregate ratings of how Assistants rated Supervisors on their creativity, level of interest in the task, influence, effectiveness, talkativeness, strength, pleasantness, how involved they were in the group’s task, and how intelligent they appeared, was created from post-test questionnaire data to serve as the outcome variable that best matched the combined subjective meanings associated with task leaders ranking high on a

Figure 6.3: Detail of Single Sound Slice.
generalized groups’ power and prestige order. I expect that participants will report subjective impressions of Supervisors that coincide with known formal structural status elements and vocal F₀ accommodation outcomes.

Calculating Vocal F₀ accommodation

Vocal F₀ accommodation is the dependent variable in this study. The term “accommodation,” refers to an adjustment of an individual’s behavior towards, or to match, the behavior of another. Vocal F₀ accommodation, then, is the adjustment of one’s vocal F₀ pattern to approximate the pattern expressed by another actor. Since vocal F₀ accommodation is something that individuals do in response to someone else’s behavior, and, the act of doing so (or not doing so) reflects meaning back onto the status arrangement between these individuals, this type of behavior calls for a new twist on Fišek and colleagues’ conceptualization of expressive cues. Specifically, I argue that because task cues can infer meaning for more than just the person emitting them; they represent a place where to which arguments from the general legitimation process literature can be successfully grafted. Endorsement behavior, such as vocal F₀ accommodation, operates as an “expressive legitimacy cue” since it signals one’s internalized acceptance (or rejection, of one does not accommodate) of the status structure. This conceptualization places it close to that of a task expressive cue; but it is not this type of cue because this behavior implicitly signals endorsement of the relationship rather than directly inferring information about an individual’s task-specific competence. Thus, I expect the vocal F₀ accommodation patterns to reflect a propensity for Assistants to adjust (accommodate) their voices to their Supervisors voices, rather than the reverse.

Vocal F₀ accommodation will be assessed using a repeated measures process of tracking the F₀ patterns of voicing and response between Supervisors and Assistants over a relatively
extended period of time spanning the initial three minutes of conversation. This is a more
detailed approach than that taken by Gregory and Gallagher (2002). Specifically, the high degree
of precision that comes with tracking iteratively-sequenced discrete utterances over time, and in
relation to one another, is an advancement this project offers over approaches that assess only the
beginning, middle, and end of interaction sequences (Gregory 1994), or a smaller number (nine)
of equal (approximately six-second) time samples over the course of a longer conversation
(Gregory and Gallagher 2002).

I model vocal accommodation by examining the correlations (Pearson r) between
interactants’ behaviors over time. Mean vocal F₀ is calculated for each utterance. The first
utterance in each session establishes the initial reference vocal F₀ for all subsequent speech. Each
subsequent utterance is examined for how it is (or if it is) adjusted in relation to the previous
utterance. The actor making each utterance is also identified so that a model of relational
behavior (to and from whom) can be created. Further, each utterance is compared to that
individual’s previous and subsequent utterances to determine the relative degree of vocal F₀
change (adjustment) that occurred in that actor’s voice. While I expect all actors to adjust their
behavior “towards” one another to some degree, the magnitude of the degree of change (or
“work”) actors make in their own voices should follow the direction and degree of the status
difference between them.¹⁸ Specifically, the lower status actors in a group (Assistants) should do
more “work” of this type than the higher status actor (Supervisor).

Iterative vocal F₀ change (HzChg) over the course of an actor’s vocalizations is calculated
by measuring the amount of change in F₀ between an utterance and the utterance that

¹⁸ Vocal F₀ cannot be “normalized” in the traditional sense using these data because baseline vocal F₀ data (pre-
interaction vocal data) for each actor are not available.
immediately preceded it. The formula below shows the calculation of a Supervisor’s (S) vocal change between two utterances at T1 and T2 (time 1 and time 2):

\[ \text{HzChg} = (T(Hz)^S - [(T-1)(Hz)]^S) \]

Over successive iterations, the adjustment of an Assistant’s voice to the voice of the Supervisor (\(\Delta^{A1/S}\)), in this case the voice of Assistant 1 (A1), is calculated with the following formula (i = iterations; j = N iterations):

\[
\Delta^{A1/S} = \frac{(((T(Hz)^{A1} - ((T−1)(Hz)^S)) * |(T(Hz)^{A1}) - ((T−1)(Hz)^{A1})|)_i}{j + (j + 1 \ldots)}
\]

Further, the three minute time period of interaction is further sectioned into 18.0 second intervals, which create 99 equal time slices. All utterances are fitted to one of these time slots and the series of utterances for each group is then collapsed a time-ordered string. Overlap between vocalization is prevented in this sorting technique by assigning time slot intervals according to the location of the median time of each utterance. Further, utterances are of varying duration and it follows that longer utterances are likely to be more consequential for the communication of deference or dominance behavior, each utterance will weighted according to its duration. The formula below shows how this is accomplished.

\[
((T(Hz)^{A1} - ((T−1)(Hz)^S)) * |(T(Hz)^{A1}) - ((T−1)(Hz)^{A1})|)_i * \text{Duration of } T(Hz)^{A1}
\]

The difference between an actor’s vocal F₀ and the T-1 lagged vocal F₀ of another comparator actor are calculated and then multiplied by the absolute value of the difference between the actors
T and T-I voice samples (to normalize the “distance” or degree of change). Then, after this has
been conducted on all vocal samples in the time-series, the mean of the product of these
calculations represents the relative accommodation of each actor toward the two other
comparator actors.
CHAPTER 7
DATA AND HYPOTHESES

Data from 63 three-person groups are examined. Table 7.1 provides information about the distribution of participants across the various conditions. Men supervised 22 mixed-gender groups, and women supervised 11 mixed-gender groups. In addition, 9 groups contained only men, and 21 groups contained only women. In all groups, Assistants were matched on their gender. Finally, as described in Chapter 6 (Pp. 73-74), the Supervisors in 30 of these groups were in the high legitimacy condition and the remaining 33 groups were informed that their Supervisors were chosen at random (the low legitimacy condition).

Table 7.1 Frequency of Observed Groups by Position, Legitimacy, and Gender.

<table>
<thead>
<tr>
<th>Position</th>
<th>Legitimacy</th>
<th>Supervisor</th>
<th>Assistant(s)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td>Man</td>
<td>Men</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Man</td>
<td>Women</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Woman</td>
<td>Women</td>
<td>10</td>
</tr>
<tr>
<td>Legitimacy</td>
<td>Low</td>
<td>Woman</td>
<td>Men</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Man</td>
<td>Man</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Man</td>
<td>Women</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Woman</td>
<td>Woman</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Woman</td>
<td>Men</td>
<td>5</td>
</tr>
</tbody>
</table>

Total = 63 groups
Originally, data were collected from 73 groups. However, insufficient audio data (based on poor audio quality due to tape degradation) for 3 groups necessitated that they be excluded from these analyses. Further, because this study was designed to examine the behavior of same- and mixed-gender groups with formally-assigned initial hierarchies comprised of “Supervisor” and “Assistant” identities with either high or low (relative) external legitimacy (authorization), groups that were found to contain participants possessing additional and potentially confounding status information such as salient race differences, age differences greater than 10 years, or other potentially confounding status information; were necessarily excluded. In all, 7 additional groups were excluded from the analysis for the following reasons: 2 groups where racial minorities occupied only Assistant roles, 3 groups with significantly older Assistants, 1 group where group members had met previously, and 1 group that contained only two participants.

In the previous chapters I have outlined the detailed expectations I have for these data. Briefly, I expect group-level analysis to reveal that assistants vocally accommodate supervisors and that gender and legitimacy should condition these effects according to their aggregated effect(s) on status. Specifically, gender should have the strongest individual effect, followed by legitimacy. Measurable $F_0$ accommodation between Assistants (presumably near-equal status actors) is not predicted. Further, role-level $F_0$ comparisons between groups are not appropriate since vocal accommodation is a situated event, the interpretation of which depends on the context of the actors’ interaction. Formal hypotheses and analyses of these data appear in the following chapter.

In absence of vocal $F_0$ accommodation data, another alternative way to analyze status outcomes is by examining the subjective impressions each group member had about others in their group. These impressions can be then used to infer the apparent status structure of the group
as reported by the participants themselves. Based on impressions data from post-task questionnaires, three indices containing various combinations of Assistants’ ratings about the relative leadership ability and status of their Supervisors were created. Specifically, responses to ten questions were incorporated, as illustrated in Appendix B.

With these questions, I created a set of variables that capture subjective impressions of Supervisor’s “leadership” and “status,” respectively; that I believe are analogous to the “power” and “prestige” order components in the exchange theory tradition (Ridgeway and Berger 1988). The first variable represents “Supervisor leadership.” This variable contains ratings of Assistants’ subjective impressions of to the degree to which Supervisors were “influential,” “good leader,” “involved,” and “strong.” These individual ratings represent unweighted averages for each variable with scores coded on seven-point Likert scales. The second variable represents Assistants’ impressions of “Supervisor status,” as indicated by to the degree to which Supervisors were “talkative,” “intelligent,” “pleasant,” “creative,” “motivated,” “interesting.” These individual ratings were assessed on similarly anchored seven-point scales.

While each index represents its own “window” into the position of Supervisors in these groups, the aggregate of all ten components that otherwise separately contribute to Supervisor Leadership and Supervisor Status shows the highest reliability (Chronbach’s alpha of 0.92 (N = 183 cases)). The reliabilities of the individual indices are also strong. Specifically, reliabilities for Supervisor Leadership showed a Chronbach’s alpha of 0.85 (N = 185 cases), while, the reliabilities for Supervisor Status showed a Chronbach’s alpha of 0.86 (N = 183 cases). Based on these descriptive properties, I choose the 10-item aggregate index as sourced from Assistants’ ratings as the variable that best captures the “power” and “prestige” order components as intended.
Gregory (1986) shows that partners converge and accommodate one another, increasingly over time, based on $F_0$. Further, Gregory and Gallagher (2002) suggest that high $F_0$ variability is associated with high status and relationship dominance. As I have discussed in previous chapters, I believe that relative vocal $F_0$ accommodation functions, in part, to reveal a groups’ underlying status structure. In particular, I argue that this measure reveals the relative degree that leaders (Supervisors) and subordinates (Assistants) work to adapt their voices as a consequence of internalized status beliefs. Because vocal $F_0$ accommodation patterns that favor Supervisors (greater adaptation “work” on the part of the Assistants towards Supervisors) are a composite of vocal deference and dominance behaviors, it might be considered appropriate by some to examine and compare both the aggregate self-ratings of Supervisors and the Assistants ratings to reveal which is better predicted by vocal $F_0$ accommodation. However, I expect that vocal $F_0$ accommodation will be more closely associated Assistants’ beliefs because I argue that more of the overall adaptation “work” captured by vocal $F_0$ accommodation scores is done by Assistants. Therefore, I expect vocal $F_0$ accommodation to theoretically more associated with Assistants’ aggregate ratings than Supervisors’ aggregate ratings – to the extent that these are different. In essence, I believe Assistants ratings of Supervisor’s “power and prestige position” are more likely to reflect vocal $F_0$ accommodation patterns. Given the near-perfect correlation between these ratings in these data (Pearson’s $r = 0.97$, sig. = 0.000), however, it is highly probable that there would not be a significant difference between them in this regard.

Further, vocal $F_0$ accommodation is a largely nonconscious behavior. Because of this, I believe it is less affected by self-monitoring and other conscious selection biases. Accordingly, I believe it is more likely to better reflect “actual” structural status conditions (according to status characteristics theory) better than Supervisors’ self-ratings or Assistants’ ratings of Supervisors.
In addition, because Assistants’ aggregate ratings of Supervisors are likely to be aligned with other endorsement behaviors, such as the more consequential vocal F₀ adaptations Assistants make towards Supervisors, these ratings are likely to perform better than Supervisors’ ratings at predicting the “actual” status structure. Thus, I have chosen to examine the relationships between Assistants’ aggregate ratings, vocal F₀ accommodation, and formal status structure. The following assumptions and hypotheses are the framework for this argument:

Assistants will vocally accommodate supervisors in interaction.

Assumption: Both Supervisors and Assistants will vocally converge towards one another (Gregory, et al. 1993).

While all group members are expected to accommodate to one another, I expect lower status group members to adjust their vocal F₀ patterns more to that of higher status group members, than these higher status group members will do in return. In short, vocal F₀ accommodation is about whom performs the most adjustment “work.”

Further, I assume that the formal assignment of “Supervisor” and “Assistant” roles will create formal status difference between the Supervisors and the Assistants, and that the same-gender Assistants will be equal in status.

Assumption: Supervisor status will be higher than Assistant status.

Assumption: Assistant 1 and Assistant 2 will be equal in status.

Thus, I expect that Assistants will vocally accommodate more towards Supervisors, than the Supervisors will vocally accommodate towards the Assistants. The variable that represents this relative vocal F₀ accommodation pattern is the net mean vocal F₀ accommodation towards Supervisor. When the value for this variable is positive, it reflects a vocal F₀ accommodation
advantage to the Supervisor; when the value of this variable is negative, it reflects that the advantage in accommodation favors the Assistants.

**H1.** Assistants will adjust their own $F_0$ to that of Supervisors more so than Supervisors will adjust their $F_0$ to Assistants.

Further, I expect that the legitimacy of Supervisors’ formal position will influence status outcomes. Because the formal status of Supervisor is likely to independently contribute to a strong cue gestalt – in absence of competing information – I anticipate that the high legitimacy conditions will operate as expected according to status characteristics theory. However, cue gestalt theory argues that the presence of salient competing information can weaken an actors’ cue gestalt, and his subsequent implicit possession of a status characteristic. Therefore, the weak legitimacy condition specifically undermines Supervisors’ status by informing all actors that this role assignment was made at random. I believe this information is likely to be sufficient to create a weak cue gestalt for low legitimacy Supervisors that will be behaviorally indicated by relatively lower levels of vocal $F_0$ accommodation.

**Assumption:** Legitimacy (in this case, authorization) of a formal status position will contribute to the actor’s related cue gestalt.

**H2.** Low legitimacy Supervisors will experience a lesser degree of vocal $F_0$ accommodation than will high legitimacy Supervisors.

However, while the theoretical framework of the revised cue gestalt theory presented in this paper leads to these assumptions and hypothesis, it is highly conceivable that evidence to support this claim may not be found in these data due to the relative weakness of the legitimacy manipulation.
In addition to formal role assignment, and the legitimacy of that assignment, the “gender-mix” of groups is expected to produce predictable status outcomes. Specifically, gender is expected to operate as a status characteristic in mixed-gender groups.

Assumption: Gender will operate as a status characteristic (with masculine gender operating as the higher state of this characteristic)

Because mixed-gender groups produce status arrangements that favor the assignment of high status to men over women, I expect that male Supervisors will receive the highest vocal $F_0$ accommodation when paired with female Assistants and female Supervisors will receive less vocal $F_0$ accommodation when paired with male Assistants than when they are paired with female Assistants.

H3. Male supervisors in mixed-gender groups will receive greater vocal $F_0$ accommodation than will female Supervisors in mixed-gender groups.

H4. Male supervisors will achieve greater vocal $F_0$ accommodation when paired with female Assistants than when paired with male Assistants.

H5. Female supervisors will achieve greater vocal $F_0$ accommodation when paired with female Assistants than when paired with male Assistants.

Further, because gender is a categorical status characteristic, while legitimacy is believed to contribute only to the establishment or undermining of a (strong or weak, respectively) cue gestalt, gender differences will create status differences while high or low legitimacy will serve to reinforce or diminish/no-effect, respectively, these status structures.

H6. High legitimacy will reinforce existing status structures and amplify expected degrees of vocal $F_0$ accommodation.

Finally, when asked about the performance of their group and the individuals in it, I expect actors’ assessments of Supervisors (both Supervisors’ self-assessments and the assessments of Supervisors by their Assistants) to reflect the relative status differences (direction
and magnitude) created by the status structure. In general, I expect that actors who achieve vocal F₀ accommodation advantage will also be highly regarded (as evidenced by ratings reflecting status, influence, and/or leadership) in proportion to their vocal F₀ accommodation advantage. To the extent that vocal F₀ accommodation reflects these structures, I predict that actors’ ratings of Supervisors will follow.

**H7.** Vocal F₀ accommodation advantage will positively correlate with perceived status.

In the chapter that follows are results of analyses concerning the ability of vocal F₀ accommodation to reveal-as-predicted changes in the status structure of these groups, the degree to which Assistants’ aggregate ratings of Supervisors leadership + status describe these same structural characteristics, and the relationship between vocal F₀ accommodation patterns and Assistants’ aggregate ratings of Supervisors leadership + status.
CHAPTER 8

RESULTS

In the previous chapters I have outlined the detailed expectations I have for these data. Briefly, I expect group-level analysis to reveal that assistants vocally accommodate supervisors and that gender and legitimacy should condition these effects. Specifically, gender should have the strongest effect, followed by legitimacy. Measurable F₀ accommodation between Assistants (presumably near-equal status actors) is not predicted. Further, role-level F₀ comparisons between groups are not appropriate since vocal accommodation is a situated event, the interpretation of which depends on the context of the actors’ interaction. Specifically, because vocal F₀ accommodation is a variable that is calculated based on the degree that a particular actor adjusts his vocal F₀ to the voice of another, minus the degree that the other(s) adjusts her vocal F₀ toward the focal actor, its interpretation is necessarily specific the each set of situated actors. Finally, I also predict that the Assistants’ aggregate subjective impressions of Supervisors’ status and leadership ability will reveal the generalized power and prestige order in the group and will correspond to vocal F₀ accommodation outcomes.

**Vocal F₀ accommodation**

The results are compelling. Table 8.1 shows a one-sample T-test (split by condition) for the expected group-level status behavior as indicated by mean Supervisor to Assistant vocal F₀ accommodation. Mean vocal F₀ accommodation for each of the eight conditions is compared to the vocal F₀ accommodation grand mean (20.52 Hz) to determine which conditions yielded
scores that were statistically different from the average vocal F₀ accommodation response across all conditions. The magnitude and valance of mean scores that are significantly different from the population mean reflect the degree and direction of vocal F₀ accommodation towards Supervisors in those conditions.

Table 8.1: Expected and Observed Differences in Status Behavior as Measured by Mean Assistant to Supervisor Vocal F₀ Accommodation.

<table>
<thead>
<tr>
<th>Expected rank in degree of status difference</th>
<th>Observed rank in degree of status difference</th>
<th>Supervisor Gender</th>
<th>Assistant(s) Gender</th>
<th>Legitimacy</th>
<th>Assistants Mean F₀ Accom. to Supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Man</td>
<td>Women</td>
<td>High</td>
<td>160.37* (87.60) [n=10]</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Man</td>
<td>Women</td>
<td>Low</td>
<td>105.59* (72.97) [n=12]</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Man</td>
<td>Men</td>
<td>High</td>
<td>-79.78* (86.95) [n=4]</td>
</tr>
<tr>
<td>3</td>
<td>Inconclusive</td>
<td>Woman</td>
<td>Women</td>
<td>High</td>
<td>10.10 (56.99) [n=10]</td>
</tr>
<tr>
<td>4</td>
<td>Inconclusive</td>
<td>Man</td>
<td>Men</td>
<td>Low</td>
<td>21.93 (57.04) [n=5]</td>
</tr>
<tr>
<td>4</td>
<td>Inconclusive</td>
<td>Woman</td>
<td>Women</td>
<td>Low</td>
<td>6.78 (57.72) [n=11]</td>
</tr>
<tr>
<td>5</td>
<td>“5”</td>
<td>Woman</td>
<td>Men</td>
<td>High</td>
<td>-128.64* (77.04) [n=5]</td>
</tr>
<tr>
<td>6</td>
<td>“6”</td>
<td>Woman</td>
<td>Men</td>
<td>Low</td>
<td>-154.47* (27.95) [n=5]</td>
</tr>
</tbody>
</table>

* = sig < .05 (1-tailed)

What is immediately apparent in this table is that not every condition produced reliable vocal F₀ accommodation patterns. Specifically, while every mixed-gender group showed mean vocal F₀ accommodation patterns that were significantly different from the test cast population mean, only the all high legitimacy all-male group did so among the same-gender groups. The lack of difference between the remaining mean scores and the grand mean suggests that the anticipated ordering in the degree of status difference is only partially supported by the data. Hypothesis 1 is generally supported in that in all five of the eight groups characterized by statistically significant
means (all of the mixed-gender groups and the high legitimacy all-male group), Supervisors received more vocal F\textsubscript{0} accommodation than did their Assistants. In addition, Hypothesis 2 is supported in mixed-gender groups when same-gender Supervisors are compared to one another, and in the all-male group. Specifically, both male and female Supervisors with high legitimacy received greater vocal F\textsubscript{0} accommodation than did low legitimacy same-gender Supervisors when working with other-gender Assistants. However, groups with high legitimacy male Supervisors paired with male Assistants produced the opposite behavior. Legitimacy does not appear to have consistent independent effects on vocal F\textsubscript{0} accommodation in same-gender groups. Only in groups of all men did high legitimacy produce an effect – it this effect was in the opposite direction predicted. This fact suggests that legitimacy and gender might interact with one another to influence on vocal F\textsubscript{0} accommodation.

Table 8.2 reports ANOVA results for the 2 (Supervisor’s Gender: Man, Women) x 2 (Assistants’ Gender: Man, Woman) x 2 (Legitimacy: High, Low) modal.
Table 8.2: Analysis of Variance: Vocal F<sub>0</sub> Accommodation by Supervisor’s Gender, Assistants’ Gender, and Legitimacy.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig. (1-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>612432.988&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7</td>
<td>87490.427</td>
<td>18.602</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>2837.102</td>
<td>1</td>
<td>2837.102</td>
<td>0.603</td>
<td>.221</td>
</tr>
<tr>
<td>Supervisor’s Gender</td>
<td>188924.818</td>
<td>1</td>
<td>188924.818</td>
<td>40.169</td>
<td>.000</td>
</tr>
<tr>
<td>Assistants’ Gender</td>
<td>326748.599</td>
<td>1</td>
<td>326748.599</td>
<td>69.473</td>
<td>.000</td>
</tr>
<tr>
<td>Legitimacy</td>
<td>265.725</td>
<td>1</td>
<td>265.725</td>
<td>0.056</td>
<td>.407</td>
</tr>
<tr>
<td>Supervisor’s Gender*Assistants’ Gender</td>
<td>476.977</td>
<td>1</td>
<td>476.977</td>
<td>0.101</td>
<td>.376</td>
</tr>
<tr>
<td>Supervisor’s Gender*Legitimacy</td>
<td>4861.508</td>
<td>1</td>
<td>4861.508</td>
<td>1.034</td>
<td>.157</td>
</tr>
<tr>
<td>Assistants’ Gender*Legitimacy</td>
<td>15069.198</td>
<td>1</td>
<td>15069.198</td>
<td>3.204</td>
<td>.040</td>
</tr>
<tr>
<td>Supervisor’s Gender<em>Assistants’ Gender</em>Legitimacy</td>
<td>26907.808</td>
<td>1</td>
<td>26907.808</td>
<td>5.721</td>
<td>.010</td>
</tr>
<tr>
<td>Error</td>
<td>258679.099</td>
<td>55</td>
<td>4703.256</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>897635.828</td>
<td>63</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>871112.086</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> R Squared = .703 (Adjusted R Squared = .665)
<sup>b</sup> Dependent Variable: Vocal F<sub>0</sub> Accommodation

The main effects of and Assistants’ gender, Supervisor’s gender, and legitimacy confirms that while the main effect of legitimacy is not statistically significant (F = 0.056, sig. = 0.407, 1-tailed), both Supervisor’s gender (F = 40.169, sig. = 0.000, 1-tailed) and Assistants’ gender (F = 69.473, sig. = 0.000, 1-tailed), appear to be the dominant independent contributing factors for status differences measured by vocal F<sub>0</sub> accommodation. Further, the two-way interaction between Assistants’ gender and legitimacy (F = 3.204, sig. = 0.040, 1-tailed) and the three-way interaction between Supervisor’s gender, Assistants’ gender, and legitimacy (F = 5.721, sig. =
0.010, 1-tailed) are also statistically significant. Overall, these results suggest that knowing the
gender-mix and legitimacy structure of such groups explain an astonishing 70.3 percent of
variance in vocal F₀ accommodation.

Hypotheses 3, 4, and 5 all offer specific predictions for vocal F₀ accommodation patterns
related to the gender-mix of Supervisor/Assistants pairings. Hypotheses 3 finds support in these
data as male supervisors in mixed-gender groups do experience greater amounts of vocal F₀
accommodation from Assistants than do female Supervisors. In addition, Hypothesis 4 enjoys
partial support, though it stems from the fact the comparison group expected to show the lesser
amount of accommodation produced inconclusive results. Finally, the evidence pertaining to the
test of Hypothesis 5 is inconclusive based on these data due to the unsystematic patterns of vocal
F₀ accommodation in all-female groups and low-legitimacy all-male groups.

Despite the fact the legitimacy was not statistically significant; I still believe it is best to
retain legitimacy in the model. I argue that the existence of the three-way interaction, in part as
explained theoretically by the way legitimacy and gender can contribute to the formation of cue
gestalts, more than justifies the slight cost of its inclusion. Overall, this model reveals more
concrete support for Hypotheses 3, 4, and 5. Unstandardized regression coefficients for
Supervisor’s gender (B = 121.03, sig. = 0.000, 1-tailed) and Assistants’ gender (B = -151.43, sig.
= 0.000, 1-tailed) further suggest that in general, male supervisors are likely to receive greater
vocal F₀ accommodation, as are all supervisors when paired with female Assistants.

To put these results in context, Figures 8.1 illustrates the effects of gender on vocal F₀
accommodation. In particular, it shows that male supervisors always receive more
accommodation in mixed-gender groups – regardless of formal position (Supervisor or
Assistant), and men also and get more of a benefit (marginal gain in receives minus sends vocal
F₀ accommodation) for being assigned “Supervisor” than do women in mixed-gender groups. In fact, women are not advantaged at all for being assigned the position of Supervisor – even when working with other women. Also, a curious finding is that male Assistants seem to accommodate to only high-status male Supervisors, while female Assistants accommodate everyone. It appears that for male assistants, gender virtually wipes out – and perhaps counteracts – the effect of formal status position.

Figure 8.1  Mean Vocal F₀ Accommodation by Position and Gender.
Figure 8.2 depicts the effect for the interaction between legitimacy and assistant gender (F = 3.204, sig. = 0.040, 1-tailed). While the magnitude of the effect is small, high legitimacy Supervisors receive greater vocal F0 accommodation from men and female Assistants.

Further, Figure 8.3 illustrates the three-way interaction between Assistants’ gender, Supervisor’s gender, and legitimacy (F = 5.721, sig. = 0.010, 1-tailed).
Figure 8.3  Mean Vocal F₀ Accommodation by Legitimacy, Assistants’ Gender, and Supervisor’s Gender.

Again, we see that women accommodate male Supervisors more than female Supervisors, regardless of legitimacy, yet women do seem to be responsive to legitimacy in the predicted fashion. However, male assistants not only seem to accommodate no one in the high legitimacy condition, but they do so only to male supervisors in the low legitimacy condition. Figures 8.4 and 8.5 depict the separate (and simpler) displays for these three-way interactions by separating high legitimacy Supervisors and low legitimacy Supervisors into two separate displays. These
graphs more readily show the curious reversal for male assistants when working with low legitimacy male supervisors. Only in this condition, did male assistants accommodate their Supervisors by adjusting their vocal $F_0$. 

**Figure 8.4** Mean Vocal $F_0$ Accommodation by Assistants’ Gender and Supervisor’s Gender for High Legitimacy Supervisors.
It is interesting that, on average, male supervisors actually accommodated male assistants in conditions of high legitimacy. This finding is not consistent with predictions based on cue gestalt theory and requires a different explanation. Behavior of this type has been documented before in all male groups. Specifically, Kollock et al. (1985) reported that individuals in male intimate couples exhibited certain dominance and supportive behavior patterns unlike those seen in cross-sex intimate couples, or even in female intimate couples. Specifically, while talking time and conversational interruptions appear largely patterned according to power advantage in all
couples, same-sex couples differed markedly according to the degree to which the less powerful partners engaged in conversational support by way of backchannels and tag questions. In female couples, the lower status partners exhibited twice the rate of backchannels and asked more tag questions than the more powerful partner. However, less powerful partners in male couples actually exhibited lower rates of backchannels and tag questions than their more powerful partners. Kollock et al. speculate that the role of a less powerful male in a male couple is “an uncomfortable one (1985:42).” High status males might understand that their lower power partners might feel alienated and uncomfortable at being left out of the conversation and they might then be contributing these supportive acts as a way to conciliate their partners. Based on my data, $F_0$ accommodation behavior also follows these patterns.

At the present time, I can only speculate that the reversal of this vocal dominance pattern might represent a form of “face-saving” socio-emotional work on the part of these high legitimacy male supervisors, on behalf of their lower status partners. Overall, legitimacy and formal position appears to be much less consequential for women than men. The gender of the Supervisor was the dominant factor that determined vocal $F_0$ accommodation and added legitimacy only benefited male supervisors in groups otherwise containing all women.

**Post-task ratings of Supervisors’ status + leadership**

An alternative way to analyze status outcomes is by collecting the subjective impressions group members had about others in their group. These impressions can be then used to infer the apparent status structure of the group as reported by the participants themselves. An index containing the aggregate ratings of how Assistants rated Supervisors on their creativity, level of interest in the task, influence, effectiveness, talkativeness, strength, pleasantness, how involved they were in the group’s task, and how intelligent they appeared, was created from post-test
questionnaire data to serve as the outcome variable that best matched the combined subjective meanings associated with task leaders ranking high on a generalized groups’ power and prestige order (a more detailed description of this index is in Chapter 7, Pp. 88-89).

Vocal F0 accommodation has already been proven as a remarkable indicator of status structure. In this second part of this chapter, I will examine the relationship between vocal F0 accommodation and this index, as well as the ability of this index to serve in a similar capacity as vocal F0 accommodation – as an outcome indicator of status structure. I have argued that participants should report subjective impressions of Supervisors that coincide with formal structural elements, and consequently with vocal F0 accommodation as well. Therefore, a model in which vocal F0 accommodation, Supervisor’s gender, Assistants’ gender, legitimacy, as well as the two-way and three-way interactions between these last three variables predicts the aggregate Assistants’ ratings of Supervisors should provide an appropriate test.

The results for this model lead me to several findings. First, the relationship between vocal F0 accommodation and the aggregate of these ratings is not statistically significant (F = 0.708, sig. = 0.404, 1-tailed). This fact appears to offer reason enough to reject Hypothesis 7. Further, the main effects for the remaining variables, as well as the two-way interactions, are similarly non-statistically significant. However, the three-way interaction between Supervisor’s gender, Assistants’ gender, and legitimacy is statistically significant (F = 3.366, sig. = 0.036, one-tailed). Therefore, it appears that this composite index does capture something related to the formal status structure that is also not related to vocal F0 accommodation.

Interestingly, what I call the “status component” of the composite index (containing only Assistants’ ratings on the degree to which Supervisors were “talkative,” “intelligent,” “pleasant,” “creative,” “motivated,” and “interesting”) does show a small (standardized coefficient = 0.382)
yet, statistically significant effect for vocal $F_0$ accommodation ($\text{sig.} = 0.043$, 1-tailed). It appears that adding the “leadership” components (Supervisors were: “influential,” “good leader,” “involved,” and “strong”) creates an index that predicts structural components better, but vocal $F_0$ accommodation more poorly.

While the composite index does offer some additional insights, I believe that vocal $F_0$ accommodation is a more robust and elegant measure of status behavior. The latter provides far more explanatory power and the data necessary to create the composite index requires a more labor intensive collection strategy, necessarily interrupts “live” ongoing interaction with questionnaires, and is generally more vulnerable to demand effects and self-monitoring on the part of the participants.
CHAPTER 9

DISCUSSION AND CONCLUSION

Group activity is more successful when the status arrangements and work assignments of members are aligned with their expertise and ability. The expectations states research program highlights the fact that presumed competencies linked to status characteristics, or in their absence, task cues leading to status typifications, are the primary factors contributing to status outcomes as groups form or face new challenges. Newcomers to such groups often quickly learn the status arrangements of a group by observing the interactions of its members. Nonverbal vocal cues, such as vocal F₀ accommodation reflect the status arrangements of a group by indicating relative vocal dominance/deference behavior between actors.

This dissertation is focused on expanding our understanding of the relationship between legitimacy, gender, status cues and cue gestalts, and the emergence, maintenance, and legitimation of informal and formal status hierarchies. My modification of the cue gestalt theory offered by Fişek et al. (2005) incorporates the process of competence-based and dominance-based legitimation into the functional framework of strong and weak cue gestalts. I have capitalized on recent theoretical and methodological advances made by researchers studying nonverbal vocal cues in micro-interaction, by introducing and testing the ability of vocal F₀ accommodation to accurately reflect the internalized status structures of three-person task groups. I believe my results suggest that vocal F₀ accommodation is a uniquely useful indicator that can be unobtrusively measured in “real time” without compromising ongoing interactions.
I argue that the relative strength of an actor’s cue gestalt, to the extent that it coincides with the perceived legitimacy of actors’ association with a status characteristic, is determined in part by the nature of its supporting categorical cues. In essence, the combinations of these meanings determine the relative credibility of an actor’s “actual” possession of a status characteristic. To the extent that this information (the entire set of categorical and/or task cues) is consistent, a cue gestalt is strong. If however, there is a dominant subset of consistent cues in a set that also contains inconsistent cues, the overall cue gestalt will be weak. Further, if no subset of cues dominates the set, a cue gestalt is not formed.

Because categorical cues draw their meaning from the social “referential structures” (status beliefs) held by actors, norms that favor the selection of men as leaders in mixed-gender groups will likely lead to the formation of weaker cue gestalts for female Supervisors than for male Supervisors. In fact, my data suggest that mild doses of authorization from a competent outside authority (the Experimenter) is often not enough to sufficiently strengthen female Supervisors’ cue gestalts to match the strength of even the cue gestalts possessed by male Supervisors who did not receive added legitimacy (as measured by vocal F₀ accommodation behavior).

The underlying assumption of the expectation states paradigm holds that “status” is always a relative and situated concept. This test of vocal F₀ accommodation as a status behavior also underscores its ability to provide researchers with a metric for comparing each actor-other pairing in ways that need-not be conceptualized as “zero-sum.” Specifically, vocal F₀ accommodation scores represent a discrete indicator of relative status and behavioral endorsement for each actor-other pair as it identifies the relative gains, reductions, or no change in deference (or dominance) behaviors for each actor, separate from the behavior of others in the
group. Importantly, in addition to serving as an indicator of the internalized status structure of a group, vocal $F_0$ accommodation functions to reinforce this structure as well as communicate it to outside listeners on a largely nonconscious “channel” related to “how” messages are conveyed over (sometimes) “what” is actually said.

However, not all of the predictions made were met with support by the data. For example, male Assistants accommodated male Supervisors more in the low legitimacy condition than in the high legitimacy condition. In fact, on average, high legitimacy Supervisors vocally accommodated Assistants in all-male groups. The theory I have presented does not explain this finding – or at least not directly – but it does mirror an earlier finding by Kollock et al. (1985) in important ways (discussion in Chapter 8, Pp. 104). Perhaps one reason high legitimacy male supervisors vocally accommodated their male Assistants more than the reverse was because this form of exchange may have served to help the male Assistants “save face” by still “sounding” in-charge. More simply, perhaps higher legitimacy male Supervisors mollified the potentially bruised egos of the other men in the group by extending a nonverbal vocal “olive branch” (relatively greater vocal $F_0$ accommodation) their way. I believe this possibility, as well as potential others, merits further investigation.

The relationship between vocal $F_0$ accommodation and actors’ subjective impression of status and leadership ability follows a different path. Evidence that supports the idea that vocal $F_0$ accommodation effects status typifications (such as that of “supervisor-assistant”) is found when one examines Assistants’ subjective ratings of Supervisor’s status and leadership ability. These ratings corresponded more closely to patterns of vocal $F_0$ accommodation than to the formal status structure. I believe this is because vocal $F_0$ accommodation reflects this structure as it is
internalized by group members. The subjective impressions from the events that unfolded accordingly reflect these internalized status structures and beliefs.

Due to the ever-increasing availability and commonplace use of digital recording devices, vocal recordings that can be used to calculate vocal F₀ accommodation patterns are easily obtainable – even in “naturally occurring” situations. Further, the relative ease of analysis using freely available software (PRAAT) and the simple algorithms I provide contribute to the attractiveness of this measure. Not only are the methods of collecting data used to calculate vocal F₀ accommodation unobtrusive and noninvasive, they result in a measure that is a highly reliable indicator of status arrangement.

Instances where nonverbal vocal behavior is being used to capture impressions of individuals are being found in a wide range of other fields, examining an array of topics – from politics (Gregory and Gallagher 2002) to education (Ambady, Bernieri, and Richeson 2000). For example of its use in the study of medical litigation, a recent empirical study by Ambady and colleagues uncovered a relationship between evaluations of surgeon’s vocal tone and their medical malpractice suit histories (Ambady et al. 2002). So, in light of their findings, these researchers argue that “…surgeons’ tone of voice in communication might be one key factor in providing satisfactory care and avoiding lawsuits (2002:9).” I believe F₀ accommodation as a measure of internalized status structures could be usefully integrated into such work.

The larger theoretical question this dissertation addresses is how individuals reach a shared definition of the situation. I argue that by combining elements of legitimacy, legitimation, and cue gestalt/status characteristics theory, we arrive at a better explanation. Further, vocal F₀ accommodation serves as a nonconscious and temporally sensitive indicator of individuals’ acceptance or rejection to the definition of the situation as they presume it is understood by
others. However, vocal F₀ accommodation might also offer more than a partial reflection of status and legitimation processes. Vocal F₀ Accommodation might also serve as one of the “subtle mechanisms” (Roshotte and Webster 2005) that contribute to the perpetuation of seemingly intractable inequalities, such as those based on gender.

The negotiation of behaviors such as vocal F₀ accommodation is part of the larger communicative processes whereby individuals exchange socially meaningful symbols related to claims about who they are; what they hope to, and are likely able to, contribute to the situation; their beliefs about the appropriateness of certain behaviors, and so on. I use Fişek et al.’s (2005) tools to bring together legitimacy, legitimation, and status processes. I also introduce a new vocal F₀ accommodation construct as a potent indicator of internalized status that also appears to be capable of making other contributions as well.

Upon reviewing an earlier version of this dissertation, James W. Balkwell aptly characterized one of the possible implications of this work by stating, “When people are trying to achieve an agreed upon definition of the situation, they may say (colloquially) that they are trying to ‘get on the same wavelength.’ Based on your findings, that metaphor may be more literal than we had previously known (2008).” I could not agree more. Based on my findings, it appears this common saying might offer us insight beyond its metaphorical appeal.
REFERENCES


“Judgments of and by Representativeness.” Science 185:1124-1131.


APPENDIX A

CORE ASSUMPTIONS OF STATUS CHARACTERISTICS THEORY AND EXPECTATIONS STATES

This appendix provides the statement of the core assumptions of status characteristics theory and expectations states, as presented in Fişek et al. (2005).

Assumption: Salience

1. Given existing paths connecting an interactant to outcome states of the group task the elements and the relations in these paths become salient in the task situation; and
2. Given status elements that provide a basis for discrimination between the interactants the states of these characteristics become salient in the task situation.

Assumption: Burden of Proof

Given that a salient status element possessed by an actor is not connected to a task outcome state, if the element is:

1. a diffuse status characteristic then the associated general expectation state will be activated, and it will become relevant to the similarly valued state of the instrumental ability relevant to the task,
2. a specific status characteristic then its relevant task outcome state will be activated and will become relevant to the similarly evaluated state of abstract task ability, and the latter will become relevant to the similarly evaluated task outcome state,
3. a behavior interchange pattern then its relevant status typification states will be
activated and will become relevant to similarly evaluated states of abstract task ability, and the latter will become relevant to similarly evaluated task outcome states.

**Assumption: Sequence of Structure Completion**

A given structure will be developed for the interactants, through the processes of salience and burden of proof. If a noninteractant later becomes an interactant, or a new actor enters the situation, or a new task is introduced, or a new behavior interchange pattern comes into existence, or new imputations of status characteristics are made, the structure will be further developed through the operation of the same processes. For any actor, those parts of the actor’s structure previously completed will remain while the actor is in the given situation.

**Assumption: Formation of Aggregated Expectation States**

Given that an actor x is connected to states of an outcome by sets of positive paths of strengths $f(i),...,f(n)$ and negative paths of strengths $f(i'),...,f(n')$. These paths will first be combined within like-signed subsets to yield a positive path value, $e_x^+$, and a negative path value, $e_x^-$, via the following function:

\[
e_x^+ = 1 - [1-f(i)]...[1-f(n)],
\]

\[
e_x^- = -(1 - [1-f(i')]...[1-f(n')]),
\]

The aggregated expectation state for that outcome is then given by

\[
e_x = e_x^+ + e_x^{-}
\]

**Assumption: Basic Expectation Assumption**

Given that $p$ has formed aggregated expectation states for self and other, $p$’s power and prestige position will be a direct continuous function of $p$’s expectation advantage over $o$ in $S$. 
APPENDIX B

POST-TASK QUESTIONNAIRE ITEM

The following is a reproduction of the questionnaire item that contained the ten questions related to Supervisor status and leadership abilities.

Please rate [your Supervisor] on the following topics:

<table>
<thead>
<tr>
<th>Supervisor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>very creative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>unmotivated</td>
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not at all creative
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interesting
uninvolved
unpleasant
good leader
unintelligent
quiet
non-influential
weak