Psychological Bulletin
2005, Vol. 131, No. 6, 898–924

0033-2909/05/$12.00 DOI: 10.1037/0033-2909.131.6.898

Nonverbal Behavior and the Vertical Dimension of Social Relations: A Meta-Analysis

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The vertical dimension of interpersonal relations (relating to dominance, power, and status) was examined in association with nonverbal behaviors that included facial behavior, gaze, interpersonal distance, body movement, touch, vocal behaviors, posed encoding skill, and others. Results were separately summarized for people's beliefs (perceptions) about the relation of verticality to nonverbal behavior and for actual relations between verticality and nonverbal behavior. Beliefs/perceptions were stronger and much more prevalent than were actual verticality effects. Perceived and actual relations were positively correlated across behaviors. Heterogeneity was great, suggesting that verticality is not a psychologically uniform construct in regard to nonverbal behavior. Finally, comparison of the verticality effects to those that have been documented for gender in relation to nonverbal behavior revealed only a limited degree of parallelism.

Keywords: nonverbal behavior, expression, status, dominance, power

Human relations can be organized along many dimensions (A. P. Fiske, 1991). Among them, the "vertical" dimension (Burgoon & Hoobler, 2002; Hall & Friedman, 1999), relating to power, dominance, status, hierarchy, and related concepts, has long been recognized as extremely important both by laypeople and scholars. The vertical dimension stands in contrast to the affective or socioemotional (horizontal) dimension, which describes the emotional closeness of interpersonal relations and the valence of feelings and behavior (Berger, 1994; Osgood, Suci, & Tannenbaum, 1957; Wiggins, 1979).

In social psychology, there is growing interest in the vertical dimension of human relations as an organizer of emotions, social thought, and social behavior. The present article focuses on associations between the vertical dimension and nonverbal behavior. The nonverbal behaviors we include involve the face, head, eyes, hands, body, and voice; interpersonal distance and angle of orientation; and ability to express emotions through nonverbal cues.

There are several reasons for treating nonverbal behavior at a descriptive, morphological level as we do, rather than more conceptually in terms of the meanings conveyed by various nonverbal cues. First, many researchers are interested in specific cues. Second, it is well known that specific nonverbal behaviors often cannot be mapped onto specific meanings with any certainty (e.g., Knapp & Hall, 2005). This problem is made more difficult when one must rely on research reports that provide little contextual and descriptive detail and therefore little insight into cue meanings. One would like to know, of course, what the nonverbal behaviors mean, for without such knowledge it is difficult to make sense of correlations between them and verticality (or anything else). In this article, we discuss possible meanings at appropriate places, though we often provide caveats about interpretation.

Defining the Vertical Dimension

The vertical dimension of human relations is difficult to capture in one conceptual definition because there are many manifestations of it. Though related conceptually because they all suggest position on a low-to-high continuum, there are distinct differences among different definitions (for discussions and definitions see, e.g., Berger, 1994; Burgoon & Dunbar, 2000; Burgoon, Johnson, & Koch, 1998; Dépret & Fiske, 1993; Ellyson & Dovidio, 1985; Gough, 1975; Hall & Halberstadt, 1997; Kalma, Visser, & Peeters, 1993; Keltner, Gruenfeld, & Anderson, 2003; Kemper, 2000; Schutz, 1958). For example, dominance can be defined as a personality trait involving the motive to control others, the self-perception of oneself as controlling others, and/or as a behavioral outcome (success in controlling others or their resources). Status, involving an ascribed or achieved quality implying respect and privilege, does not necessarily include the ability to control others or their resources. Similarly, power defined as the capacity or structurally sanctioned right to control others or their resources

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This research was supported by a grant from the National Science Foundation, awarded to Judith A. Hall. Deep appreciation is given to the following people for their careful reading and feedback: Dana Carney, Amy Halberstadt, Nora Murphy, Janelle Rosip, and Marianne Schmid Mast. Thanks are also extended to Andrea Sparko and Gloria Tower for bibliographic assistance.

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does not necessarily imply prestige or respect. Other distinctions have also been drawn, including different functional bases of power, such as reward power, expert power, referent power, or coercive power (French & Raven, 1959), and outcome dependency (Stevens & Fiske, 2000). Some writers conceptualize dominance in terms of social skill (e.g., Burgoon & Dunbar, 2000; Byrne, 2001). Some writers define dominance as the enactment of certain nonverbal or verbal behaviors (Rosa & Mazur, 1979). Authors do not use the various verticality terms such as power, dominance, and status in consistent ways, and often the terms are used without a clear definition.

If the different conceptual definitions of verticality are not synonymous, then it follows that positions on different dimensions of verticality may not be concordant within a person across time, relationships, or situations. For example, a person who has earned high status in her or his profession may have low personality dominance, a person who is in a position of high structural authority may be ineffectual in obtaining compliance from others, or a person who emerges as a leader in a work group may be a follower among peers or meek at home. Thus, there are many complexities within the overall concept of verticality. In this article, we use the term *verticality* to represent many specific conceptual and operational definitions, with the abbreviation "V" standing for the verticality construct. Where appropriate, more specific definitions are discussed. In the present review, we categorize studies into three broad categories of V definitions: personality, role/rank, and social class.

V and Nonverbal Behavior

The V dimension has often been studied in relation to nonverbal behavior and nonverbal communication skill (which are together called "NVB," for "nonverbal behavior," in this article). Theoretical interest in the topic developed with Goffman's (1956) essay, "The Nature of Deference and Demeanor," and Henley's (1977) book, *Body Politics: Power, Sex, and Nonverbal Communication.* Drawing on some of the research available at the time, Henley developed the argument that NVB has an important relation to the expression of V and to the maintenance of roles based on V. She wrote:

> Whether the behaviors we are concerned with are seen as simply *associated* with power, *affecting* it, or *resulting* from it; as *symbols* or *expressions*; as *describing, establishing* or *maintaining* power; we can observe that power and nonverbal behavior are intimately and fruitfully linked. (p. 25)

Because NVB is often tacit and unconscious, and therefore off-the-record, as it were, it is said to be well suited to express and maintain V without the need to invoke it explicitly. Presumably, gazing, smiling, touching, and various body positions can signal high and low V (e.g., a high-V person is said to have more prerogative to touch a low-V person than vice versa; Henley, 1973) and can also influence behavior directly (as, e.g., through a touch that literally controls the other person's movements).

Henley had a special interest in the interconnections among gender, V, and NVB (Henley, 1973, 1977, 1995), as did Goffman (1979). Henley listed parallels between the behaviors associated with V and the behaviors of women and men, arguing that the parallelism was no coincidence: Women's nonverbal sensitivity, gazing, smiling, expressiveness, touching others, use of personal space, and posture (as examples) differed from men's because women and men were enacting the behaviors of people low and high in V, respectively.

The idea that V is related to NVB has become so well known that it is cited in social psychology and psychology of women textbooks, often in the context of explaining gender differences in NVB and typically as an established fact rather than as a hypothesis needing to be tested (Crawford & Unger, 2000; Feldman, 1995; Lippa, 1994; Lips, 2001, 2003; Matlin, 2000; Yoder, 2003). For example, the well-established tendency for men to smile less than women (Hall, 1984; LaFrance, Hecht, & Levy Paluck, 2003) is often interpreted in light of the assumed tendency of high-V individuals to smile less than low-V individuals.

Previous Summaries of Research

Assertions about the relation of V to NVB should, of course, be supported by empirical evidence. Surprisingly, however, considering the widespread interest in this question, there has not been a comprehensive summary of the literature. Henley (1977) drew more on anecdote and everyday observation than on empirical studies, and, of course, the amount of empirical literature available when she wrote was far less than is the case today. Other reviews that cover this topic are also outdated and/or very limited in their coverage of the literature (e.g., Berger, 1994; Burgoon & Bacue, 2003; Edinger & Patterson, 1983; Giles & Street, 1994; Kleinke, 1986; Mehrabian, 1969). Only one meta-analytic treatment is available (Hall, Halberstadt, & O'Brien, 1997), on the relation of V to accuracy in decoding the meanings of nonverbal cues. Furthermore, when discussing this topic, authors frequently obscure the difference between studies on beliefs or perceptions of the V–NVB relation, on the one hand, and studies that document how people higher or lower in V actually behave, on the other (e.g., Burgoon & Bacue, 2003; Dovidio, Brown, Heltman, Ellyson, & Keating, 1988). Establishing whether beliefs are correct is an empirical question. For all of these reasons, we considered a comprehensive meta-analytic summary that distinguishes between perceived and actual V–NVB relations to be long overdue.

Such summaries as have been conducted on actual V–NVB relations have often led to ambiguous conclusions or results that are surprising in the context of Henley's (1977) hypothesis. Knapp and Hall (2005), in discussing the relation of gazing to V, concluded that the studies were very contradictory. Stier and Hall (1984) concluded that interpersonal touching and V had an ambiguous relation. Hall, Horgan, and Carter (2002) concluded that studies did not support a relation between smiling and V. Hall et al. (1997) concluded in their meta-analysis on V and nonverbal decoding skill that the literature showed a *positive* relation between these two constructs. Such conclusions are at odds with the theorizing of Henley (Henley, 1977, 1995; LaFrance & Henley, 1994). However, with the exception of Hall et al. (1997), none of these conclusions was based on a thorough search of the literature or on a quantitative summary of the data.

An exception to this pattern of uncertainty is research on the visual dominance ratio (VDR). The VDR is defined as the percentage of gaze while speaking divided by the percentage of gaze while listening (Dovidio & Ellyson, 1985). Research has clearly demonstrated that higher V is associated with a higher VDR for

both men and women and for definitions of V that include personal expertise on a topic (Dovidio, Ellyson, Keating, Heltman, & Brown, 1988; Ellyson, Dovidio, & Corson, 1981), gender-congruent expertise on a topic (Brown, Dovidio, & Ellyson, 1990), objectively measured rank (Exline, Ellyson, & Long, 1975), experimentally ascribed status (Ellyson, Dovidio, Corson, & Vinicur, 1980), reward power (Dovidio, Ellyson, et al., 1988), and personality dominance (Ellyson et al., 1980). Also, when the VDR is manipulated in stimulus videotapes, a higher VDR is perceived by observers as indicating higher V (Dovidio & Ellyson, 1982). Because research on the VDR is clear, it is not included in the present meta-analysis. Also, we did not rereview studies on nonverbal decoding skill because the meta-analysis of Hall et al. (1997) is recent and there was little new research on this topic.[1]

The Present Review

We present meta-analytic summaries for numerous NVBs in relation to a wide range of different definitions of the V construct. Because the relation of V to NVB is widely believed to exist, we first examine studies involving perceivers' beliefs. We use the terms *perceptions* and *beliefs* interchangeably to refer to people's assumptions or stereotypes about the association between V and NVB. In these studies, V or NVB, or both, were guessed or imagined by naïve perceivers or coparticipants in the absence of independent criteria. In the great majority of studies, the perceivers made V ratings (e.g., power, status, potency, or dominance) of nonverbal stimuli represented in media such as video clips or photos, but in some of these studies, the perceivers were asked to imagine scenarios or to form impressions of people with whom they had briefly interacted.

An illustrative perception study is that of Otta, Lira, Delevati, Cesar, and Pires (1994), in which observers rated leadership in smiling and nonsmiling faces. By relating perceivers' impressions of leadership to the presence or absence of smiling, the researchers inferred perceivers' implicit beliefs about the relation of V to NVB. Most studies in the meta-analysis used a design like this to infer beliefs from obtained correlations; extremely few studies directly asked perceivers to state their beliefs about the relation of V to NVB (e.g., Nagashima & Schellenberg, 1997). In the standard design, a nonzero correlation between perceived V and a given cue (e.g., smiling) is interpreted to mean that perceivers associated that cue with V, and the sign on the correlation tells whether people associated more or less V with the behavior in question.[2]

In contrast, we use the term *actual* to describe findings from studies in which the investigators used independent, objective criteria to determine V and to measure NVB, thus allowing for the examination of actual NVB differences among people who differ in their actual levels of V. Illustrative studies on actual V–NVB relations are by C. Johnson (1994), who videotaped college students in experimentally assigned manager versus employee roles in a mock business, and by Hall and Friedman (1999), who videotaped employees occupying different hierarchical positions in a company while they had a structured conversation. In both studies, NVB was assessed by neutral observers.[3]

The comparison of actual V–NVB relations to perceived V–NVB relations can be discussed within a lens model framework (Brunswik, 1956). In the lens model, the investigator collects criterion data for a group of target individuals, codes their behavior, and collects perceivers' impressions of the criterion construct in the target individuals. By comparing these elements, the investigator can draw inferences about how the construct (such as V) is manifested in the targets' behavior, how perceivers use cues to infer the construct, and whether perceivers can accurately judge the construct. Lens model studies and reviews have been done for NVB in relation to personality traits (Berry & Hansen, 2000; Borkenau & Liebler, 1995; Gifford, 1994; Lippa, 1998), intelligence (Borkenau & Liebler, 1995; Murphy, Hall, & Colvin, 2003; Reynolds & Gifford, 2001), deception (Zuckerman & Driver, 1985), and the V dimension (Schmid Mast & Hall, 2004b; Schmid Mast, Hall, Murphy, & Colvin, 2003). The present review does not attempt a complete lens model analysis because there has been very little research to date for one of the crucial elements (accuracy of judging targets' levels of V; Barnes & Sternberg, 1989; Schmid Mast & Hall, 2004b; Schmid Mast et al., 2003). However, we do compare the results for actual versus perceived V–NVB relations.

Theoretical Frameworks for Understanding Actual V–NVB Relations

Henley (1977) made assertions about the relation of a person's V to NVB, for example, smiling (high V goes with less smiling), interpersonal sensitivity (high V goes with less sensitivity), and touching (high V goes with more touching).[4] In each case, the V difference was said to parallel the corresponding gender difference

[1] An additional reason for excluding the V–VDR relationship from this review is that the test of the V–VDR relation typically takes the form of two- and three-way interactions that differ in form between studies and are not amenable to meta-analytic summary.

[2] A potential source of error in interpreting the basis of perceptions can occur if the stimuli contain co-occurring behaviors. For example, if smiling faces also had more raised eyebrows, then one could not be sure whether perceivers were using the smiling or the raised eyebrows in making their ratings of the V construct. With naturalistic stimuli (e.g., videotapes of targets in social interaction), this ambiguity is more likely than in studies using more controlled stimuli or confederates who vary their behavior. However, even with confederates, the problem may remain because confederates cannot always control their NVB fully (Lewis, Derlega, Shankar, Cochard, & Finkel, 1997). However, combining results across studies helps with this problem, on the assumption that the same NVBs do not always covary from one study to the next. Nevertheless, causal interpretations should be made with caution. To avoid repetition, we do not make this caveat as each behavior is discussed.

[3] We acknowledge that the difference between a perceived V study and an actual V study may sometimes be a matter of degree rather than kind. For example, it is possible that stereotypical beliefs about the V–NVB relation could bias the coding of nonverbal behavior, or the NVB of the people observed could be biased by their own stereotypes about the V–NVB relation. However, we believe the perceived-actual distinction to be theoretically very important, and, therefore, it plays a large role in the present article. It was also a distinction that was easy to apply in practice.

[4] Henley's (1977) book, being a popular-style book more than a scholarly treatise, presents difficulties for extracting firm predictions and establishing operational criteria (e.g., more gaze and less gaze appear respectively to be called *staring* and *ignoring* if men and high-V people do them and *watching* and *averting* if women and low-V people do them). Our present goal is not to criticize any specific statements by Henley (1977) but rather to acknowledge the broad hypothesis that has become so influential in this field.

in behavior. There are numerous possible reasons why one might find the predicted relation between actual V and NVB (see, e.g., Hall, Carter, & Horgan, 2001; Hall, Horgan, & Carter, 2002), but the one Henley focused on was the interpersonal motives of the low-V person. A person low in power is dependent on those with more power in specific interactions or, as Henley implied, has internalized the behavior pattern of a less powerful person through years of socialization, with its associated expectations and reinforcements (as with women's trait-like tendencies to smile, gaze, and be interpersonally sensitive; Hall, 1984). For example, Henley (1977, p. 175) wrote that the smile is woman's "badge of appeasement." In other words, the less powerful person needs to please others by being pleasant, needs to attend to others' moods and desires by gazing at them, needs to be interpersonally sensitive in order to optimize interaction outcomes, and is expected to be deferent and polite by using constrained body movements, taking up less physical space, sitting up straight, and so forth.

This analysis suggests that the repertoire of NVB possessed by the person low in V is both directly functional (e.g., by gazing more, the low-V person gathers more of the information he or she needs for optimal adaptation, or by smiling, the low-V person is better liked by a powerful other) and indirectly functional (the person signals his or her low V by engaging in a behavior that is mutually understood to reflect low V, thereby maintaining a stable interaction climate for both and winning rewards for proper role conformity by the low-V person). Thus, the relations of V to NVB may be associated with subtly different motives (desire to please, to gather information, to signal role conformity), but collectively, these motives can all be seen as manifestations of what it means to lack social control or status.

Rosenthal and DePaulo (1979) presented an interpretation of gender differences in nonverbal communication skills that was similar to Henley (1977) in certain ways. Though they did not argue explicitly in terms of power as the source of such gender differences, they proposed that women's need to be accommodating (which one can presume is related to their lower social power) underlies these skills. Rosenthal and DePaulo suggested that women's advantage over men in decoding nonverbal cues is greatest for cues that the expressor is likely to be very aware of sending (such as facial expressions) and smaller for cues that are likely to be emitted without awareness (such as affect expressed through the voice)—arguing that the former skill is accommodating, whereas the latter skill is not. They also suggested that women's superior accuracy in expressing emotions through nonverbal cues is similarly due to their need to be accommodating.

Most recently, Keltner et al. (2003) suggested that the dominant–subordinate dimension maps onto approach and avoidance motives, with associated behavioral tendencies. They suggested that interpersonal sensitivity should be higher in subordinates because of their motive to reduce threat by gathering information.[5] They also suggested that subordinates should express more negative affect in their NVB. Note that the latter prediction runs counter to Henley's (1977) suggestion that low-V persons show increased levels of smiling. Other writers have also suggested relations between V and emotional experience, which of course has implications for NVB (Conway, DiFazio, & Mayman, 1999; Kemper, 1991; Tiedens, 2001; Tiedens, Ellsworth, & Mesquita, 2000).

An attempt to reconcile different predictions (and results, as we shall see) immediately confronts the complexity of social pressures, goals, motives, emotions, and contextual variables that may impact any given interaction. Because such factors may be highly variable as well as often unknown in practice, many different, even opposing, outcomes may be possible. Existing theories tend toward main-effect predictions about V's effect on NVB and do not systematically yield predictions that account for varying social or emotional contingencies.

Some contextual contingencies can be viewed as moderator variables and empirically examined for their ability to explain variations in effects. Doing so increases understanding of the landscape of effects over various situations (e.g., specific definitions of V, different sample characteristics, and the like). The existence of moderators qualifies, but does not intrinsically challenge, the basic notion that V may influence NVB.[6] However, a close consideration of contextual contingencies reveals a grave potential problem in the interpretation of V as a causal variable because such contingencies may be confounded with V. More specifically, V is likely to be associated (not necessarily causally) with many psychological variables that may be the actual proximal influences on NVB. To illustrate, smiling in a low-V person may increase if the person is motivated to please others but may decrease if the person is feeling anxious, depressed, or angry or defines his or her role as requiring a serious demeanor. Both low- and high-V individuals have motives, emotions, and role definitions, such as those named above, which together can be termed *proximal states*. Therefore, to continue with the smiling example, a high-V person's smiling may be influenced by how much he or she wants to win approval, how self-satisfied he or she feels, or whether he or she construes power in punitive or nurturing terms. Furthermore, whatever one's level of V, the NVB that is displayed may be strongly influenced by whether one is striving to change one's V or is content to maintain it at its current level (Schmid Mast & Hall, 2003). The ultimate outcome—who smiles more than whom—will depend on the balance of their respective proximal states (goals, motives, construals, emotions, etc.). If the high-V person's motive to smile, for example, is stronger than the low-V person's, then the balance will be tipped in favor of the high-V person smiling more. As we hope the examples make clear, V as a general concept does not map onto any particular motives, emotions, or role definitions. As a consequence, we predicted that actual V would have weak and/or inconsistent relations to NVB because of the possibility that it is these proximal variables (which may not be the same across participants within or across studies),

[5] When interpersonal sensitivity is defined as a trait, the available evidence contradicts this prediction (Hall et al., 1997). When interpersonal sensitivity is defined in terms of judgments of a specific other person in a dyadic paradigm, greater sensitivity is sometimes found among lower V persons judging higher V counterparts than vice versa. However, in all studies conducted to date, this difference was found to be attributable to differences in the quality of the expressions being judged (Snodgrass, Hecht, & Ploutz-Snyder, 1998) and more specifically to the relatively poor-quality expressions sent by the low-V persons (Hall, Rosip, Smith LeBeau, Horgan, & Carter, in press), not to heightened motivation to decode well among the low-V persons.

[6] There is also the possibility that NVB causes V. See Hall and Halberstadt (1994) for a discussion of this issue.

rather than V, that influence NVB (Hall & Halberstadt, 1997; Hall, Carter, & Horgan, 2001; Hall & Friedman, 1999; Hall, Horgan, & Carter, 2002).

Overview of the Meta-Analysis

The literature included many operational definitions of both V and NVB. Therefore, an important aspect of the task was how to deal with such variety. We decided to maintain a high level of detail in the coding and to combine specific variables, as seemed sensible, into larger aggregates at the point of analysis on an a priori basis.

Results were coded in terms of the overall direction of the V–NVB relation (irrespective of statistical significance), the Pearson product–moment correlation (*r*) as the indicator of effect size, and the standard normal deviate *Z* as an indicator of the likelihood of a given effect. Standard meta-analytic procedures were used for combining these indicators, testing whether effects were significantly different from zero, examining variability among effect sizes (homogeneity), and estimating the robustness of the obtained effects against unretrieved null effects. Study characteristics were coded for descriptive purposes and to examine as possible moderators.

Method

Search Procedure

The literature was searched through 2002. PsycINFO and Dissertation Abstracts International (online version) were searched by crossing V terms with NVB terms. V terms were *dominance*, *status*, *rank*, *power*, *hierarchy*, *authority*, *expertise*, *subordinate*, *submissive*, *personality*, *socioeconomic*, *socioeconomic status* (SES), *education*, *income*, and *occupation*. NVB terms were *nonverbal*, *emotion*, *expression*, *face* (*facial*), *smile* (*smiling*), *voice* (*vocal*), *gesture*, *touch*, *proxemic*, *gaze*, *distance*, *hand* (*movement*), *body*, and *posture*. In addition, the bibliographies in retrieved studies and literature reviews were examined.

Inclusion and Exclusion Criteria

As described earlier, studies could be either on actual V in relation to NVB or on beliefs (perceptions) about V–NVB relations. Other inclusion criteria were that the study (a) defined V consistent with our criteria (see below); (b) measured or manipulated NVB according to our criteria (see below); (c) was published (in an article or book) or was a doctoral dissertation; (d) was written in English; (e) used primary participants who were adolescents or older (younger children could be the interaction partners of the primary participants); (f) used primary participants with normal psychological function (not psychiatrically diagnosed or otherwise labeled as a clinical sample, and not blind, deaf, learning disabled, alcoholic, autistic, or having developmental disability); and (g) documented at least one association between a person's actual or perceived NVB and his or her actual or perceived V. In other words, we included only studies of NVB and V in the same target or stimulus person, not studies in which the NVB of one person was related to the V of a different person.[7]

Coding of the V

We defined the V construct to include (a) situationally defined power, expertise, or status (e.g., manager–subordinate or teacher–student roles, organizational rank, or task-based advantage such as in a situation in which one interactant was more expert on the discussion topic than the other), all of which we called *role/rank*; (b) dominant or assertive personality, as measured by self-report (nearly always on a standard personality scale), by reports of well-acquainted others, or objectively measured influence in an interaction, all called *personality*; (c) SES, which included measures of income, education, occupational prestige, or combinations of these; and (d) impressions of dominance, assertiveness, leadership, or group influence on the basis of brief exposure to, or brief interaction with, previously unfamiliar target persons, called *ratings*. This last category was used exclusively for the belief studies, whereas the first three categories occurred for the actual studies and occasionally for a belief study (if, e.g., perceivers were asked to imagine someone having a particular kind of V).

Some variables were excluded as operational definitions of the V construct. V could not be defined as popularity or peer acceptance, aggression, competition, persuasion, Machiavellianism, or internal locus of control. V could not be defined in terms of gender, race, or age per se (e.g., Leffler, Gillespie, & Conaty, 1982; Ridgeway, Berger, & Smith, 1985); however, studies in which one of these variables might be correlated with V (as in a professor–student interaction, in which age is correlated with V) were included. Finally, V could not be defined in terms of another category of communication, such as gazing patterns or speaking time (e.g., Kalma, 1991; Rosa & Mazur, 1979; Strongman & Champness, 1968).

Coding of NVB

NVB was defined as movements, positions, qualities, or expressions of the face, eyes, head, body, arms, legs, feet, or voice. We also included posed encoding skill (i.e., ability to convey messages intentionally through nonverbal cues). The following were excluded from the operational definition of NVB: static appearance or physiognomy (such as thickness of brows or baby-faced appearance); clothing and adornments, including make-up, hairstyle, and accessories; ratings of behavior that were too global to allow for a distinction between verbal and nonverbal behavior (e.g., ratings of "warmth" on the basis of an overall impression of a person); and seating location (e.g., head of a table). Verbal behavior (e.g., speaking time and forms of speech such as tag questions and intensifiers) was not included, but some behaviors at the verbal–nonverbal boundary were included (e.g., rate of speech, interruptions, back-channel responses).

Because there were a great many specific definitions of NVB, it was necessary to group variables a priori into larger categories. Table 1 shows the categories of NVB summarized in this article and the specific coded behaviors included in each.

Unit of Analysis

The unit of analysis was defined as an independent group of participants, which might be called a study, experiment, sample, subsample, group, or subgroup by the original authors. In our terminology, a study is any such independent group for whom data were extracted and entered into the meta-analysis. In contrast, a source is a published article, book, book chapter, or dissertation. Study and source are not synonymous because a given source may contain several studies, and a given study may be reported in more than one source. The decision whether to break a larger study into subgroups to be called separate studies was based on how complete the data reporting was under the two options. For example, an author might not only report results for the whole sample but also report

[7] This is not to say that such effects are not interesting and potentially important. Babad, Alexander, and Babad (1983) found that, based on an interview and experimental tasks, mothers' dominance was not related to their own smiling but was related to their child's smiling such that more controlling and dominant mothers had children who were less likely to smile. (This study is not included in the meta-analysis because smiling was assessed largely in terms of smile responsiveness to an experimenter's smiles rather than overall smiling.)

Table 1
Categories of Nonverbal Behavior and Specific Behaviors

Category	Behaviors
Smiling	Smiling (frequency or yes/no), smile vs. frown, broad vs. open smile, facial agreement (= smiling), number of time: samples in which smiling was present, smile duration, smile rate, facial pleasantness
Gazing	Eye contact (amount or high/low), % eye contact, gaze, gaze frequency, gaze duration, maintains eye contact
Raised brows	Eyebrows raised/lowered, eyebrow flash
Facial expressiveness/intensity	Facial expressiveness, intensity of facial expression
Nodding	Nod frequency, number of time samples in which nodding occurred, nod rate
Self touch	Self-touch duration, self-touch frequency, self-touch rate, frequency of touching nose, lip, hand, face, head or hair, hands on legs/knees preparatory to getting up
Other touch	Hand on arm, shoulder, back, knee, or hand (frequency or yes/no), physical contact, touch other, self-reported touch tendencies, touch duration, instrumental touch
Hand/arm gestures	Gesture (frequency or yes/no), gesture rate, illustrators/emblems, illustrators, illustrator frequency, gesture frequency while speaking, arm/shoulder gestures
Postural openness	Legs open, leg extension, arm wrap (reversed), body position open/closed, arms away from body, making oneself look smaller (reversed), arms akimbo, arms clasped behind head with elbows out
Postural relaxation	Erect posture (reversed), lean backwards, relaxed standing posture, leg lean, forward lean (reversed), body cant, relaxed sitting posture, body lean, sitting on edge of seat (reversed), sideways lean, leg relaxation
Body/leg shifting	Leg movement frequency, leg recrossing, torso movement frequency, body movement variability, shifting position while sitting, shifting seat while listening or speaking, shifting legs while speaking, rate of shifting/moving legs while sitting
Moving feet	Rate of shifting/moving feet, time spent moving feet, average duration of foot movement
Interpersonal distance	Seated distance to a fixed other, standing distance to a fixed other, mutual proximity
Facing orientation	Directness of orientation to interaction partner
Vocal variability	Variability in speech pitch and loudness, flat voice (reversed), pitch or fundamental frequency variation, loudness variation, vocal animation
Loudness	Loudness, amplitude
Interruptions	Successful interruption, interruptions, unsuccessful interruptions, interruption rate
Overlaps	Overlapping simultaneous speech
Pausing/latency	Average response latency before speaking, pause rate, pause frequency, hesitation frequency
Filled pauses	Use of "uh" (frequency or yes/no), filled pause rate, filled pause frequency
Back-channel responses	Back-channel responses
Speech errors	Rate of verbal influency, speech errors
Laughter	Laughing frequency, laugh rate, relaxed laughter
Rate of speech	Rate of speech
Pitch	Voice pitch, fundamental frequency
Vocal relaxation	Tense voice (reversed), vocal relaxation
Encoding skill	Posed expression skill (face and/or standard content vocal encoding)

results for subgroups (e.g., genders or experimental conditions). If the results for the subgroups were adequately reported, we entered them as separate studies (this occurred 12 times for "actual" studies and 8 times for "belief" studies). If the author gave more complete results for the entire sample, then we entered the entire sample as one study.

Within the analysis of a given NVB, all studies are independent (i.e., different groups of people). If a given study included several very similar NVBs (see above for description of grouping NVBs), these results were averaged so that only one finding would go into the analysis for that behavior. For example, if a study measured both frequency and duration of smiling, then those two results would be averaged to comprise a single smiling-V result.

When a study produced results for two or more NVBs that were too dissimilar to be combined within the same NVB category (e.g., interpersonal touch and interpersonal distance would not be combined), the study appears in both of the relevant summaries (e.g., for both touch and distance). Thus, independence was maintained within a NVB summary but not between NVB summaries.

Coding of Study Attributes

Coding of study attributes was done by Judith A. Hall, Erik J. Coats, and Lavonia Smith LeBeau. After establishing reliability between themselves (see below), Judith A. Hall and Erik J. Coats checked the coding of Lavonia Smith LeBeau. Some coding variables were common to both actual and belief studies, and some were applicable to only one kind of study. Table 2 presents descriptive statistics for the study attributes.

Coding of Results

Extraction of results was done by Judith A. Hall and Erik J. Coats, who divided the work between them. They checked each other for approximately 80% of the studies. For each result in each study, the following information was extracted: *N*, effect size (Pearson *r*), and *Z* (standard normal deviate). Results that were reported as *F*, *t*, chi-square, or means and standard deviations were converted, using standard procedures, to the *r*-metric (Rosenthal, 1991). All Pearson *r*s were converted to their Fisher *z* equivalents for analysis (Rosenthal, 1991) and converted back to the Pearson *r* for presentation. All Pearson *r*s and *Z*s were given signs such that positive values meant that higher V was associated with higher values on the behavior in question; for example, a positive association between interpersonal distance and organizational rank would mean that people higher in rank used larger interpersonal distances.

Intercoder Reliability

Reliability was established between Judith A. Hall and Erik J. Coats, who did most of the coding of study characteristics and trained the third coder. Classification of a study as being about perceived or actual V–NVB relations, stimulus medium for belief studies (whether photo, video, etc.),

Table 2
Study Attributes (Percentages)

Variable	Belief (k = 120)	Actual (k = 91)
Age[a]		
Adolescents	7	2
College	74	67
Older than college	19	31
Verticality definition		
Personality[b]	88	46
Role/rank	11	44
SES	1	10
Verticality design		
Experimentally manipulated	8	32
Measured (including attained and self-report)	7	68
Formed impression	86	0
Nonverbal behavior design[e]		
Experimentally manipulated	60	—
Measured (including self-report)	29	—
Formed impression	11	—
Nationality		
United States/Canada	75	89
Great Britain/Europe	9	7
Asia	7	3
Central/South America	3	0
Setting		
Laboratory	76	79
Field	19	21
Gender composition[c]		
Same gender	29	28
Opposite gender	6	13
Both same and opposite gender	45	48
Other's identity[d]		
Confederate/experimenter/interviewer	—	24
Real person (stranger)	—	38
Real person (acquainted)	—	25
Stimulus medium[e]		
Imagined	10	—
Written	3	—
Photographs	27	—
Silent video	5	—
Vocal only	13	—
Audiovisual	10	—
Confederate	15	—
Drawing	5	—
Live	13	—
Group size[c]		
Individual	25	12
Dyad	68	74
3–5 people	7	7
6 or more people	1	7
Type of task[d]		
Free interaction (e.g., get acquainted)	—	24
Assigned topic of discussion	—	20
Structured discussion (e.g., reach consensus)	—	21
Structured activity (e.g., play game)	—	9
Interview	—	19
Type of publication		
Dissertation	19	20
Article/book	81	80

Note. Percentages may not add to 100 because of rounding or because uncodable or "other" occurrences are not shown. k = number of independent studies; SES = socioeconomic status.
[a] For belief studies, age refers to perceivers. [b] For belief studies, personality refers to impressions of dominance. [c] For belief studies, gender composition and group size refer to the stimuli being judged. [d] Not applicable for belief studies. [e] Not applicable for actual studies.

and type of publication (published vs. dissertation) were considered objective enough not to need a reliability check. Nationality was coded for a set of 21 studies, and type of task was coded for a set of 16 studies. For the other variables listed below, reliability was calculated for two independent sets of studies (14 and 24 studies, respectively); the latter reliabilities are reported in terms of the average reliability across both sets. Type of task was coded for a separate set of 16 studies.

Reliabilities (see Table 2 for an explanation of the coding variables and categories) were: sample size for actual studies, $r = 1.00$, 96% agreement; sample size of perceivers for belief studies, $r = .99$, 90% agreement; age of participants (or of perceivers, in the case of belief studies), 84% agreement; V definition, 84% agreement; V design, 94% agreement; NVB design, 100% agreement; nationality, 100% agreement; setting, 92% agreement; gender composition of group, 82% agreement; other's identity for actual studies, 84% agreement; group size, 82% agreement; and type of task for actual studies, 88% agreement.

Analysis

The combining of results for similar NVBs within a study was done by averaging their Fisher *z* transformed Pearson *r*s and standard normal deviate *Z*s. Correlations and *Z*s of zero were imputed for the unknown values before averaging if some Pearson *r*s and *Z*s were known and others unknown in a study.

Central tendency was estimated using several indicators: unweighted mean *r*, mean *r* weighted by sample size (sample size of perceivers in the case of belief studies), and median *r*. Another indicator of central tendency was a simple tally of the signs of the results (positive, negative, literally no difference, or unknown), disregarding whether individual results were statistically significant. Statistical significance of the set of results was calculated both as a fixed-effects 95% confidence interval around the weighted mean *r* (Lipsey & Wilson, 2001) and as a fixed-effects combined probability using the Stouffer method (Rosenthal, 1991). This method yields a combined *Z* with an associated *p* value (one-tailed). The homogeneity of the known Pearson *r*s was tested with a chi-square test (Rosenthal, 1991). A significant chi-square indicates that the Pearson *r*s are more variable than one would expect from sampling variation alone. Finally, when the combined *Z* was significant, the file drawer estimate was calculated (the number of unretrieved results averaging $r = 0$ that would need to exist in order to make the combined *Z* not significant; Rosenthal, 1991).

All of the above statistics, except for the homogeneity test and the confidence interval, were calculated both for known Pearson *r*s only and for all studies (when all studies were included, unknown Pearson *r*s were estimated to be zero). Calculating the summary statistics both ways effectively establishes upper and lower boundaries for the results (B. T. Johnson & Eagly, 2000).

When analyzing standard normal deviate *Z*s, the exact *Z* was used when it could be calculated. If the Z was smaller than $|1.96|$, or if the original author called the result "not significant" without providing enough information to allow calculation of *Z*, we refer to the result as not significant.

Testing for moderators was done according to the following principles: Moderators were tested only when there were eight or more available Pearson *r*s and there were at least three Pearson *r*s per moderator category. Because the list of potential moderators was long (see Table 2) relative to the number of available studies for a given NVB (which precluded isolating the effects of one moderator while controlling for others), and because we had no a priori predictions regarding any of the potential moderators, we tested only V definition and publication type (published vs. dissertation) on an a priori basis. Though we had no prediction for either of these variables, they were important to analyze for descriptive purposes. In addition, we discuss (test or speculate on) many other moderators as they relate to particular NVBs.

Results

Overview of Presentation

First, perceived V–NVB relations are presented, followed by actual V–NVB relations. Each section begins with a summary of the descriptive features of the studies and proceeds to a summary of V–NVB relations. The following conventions were established to determine whether the correlations between V and a given NVB are (a) shown with a quantitative summary in a table, (b) discussed in the text only, or (c) not discussed at all. NVBs for which three or more Pearson *r*s were available were analyzed using the meta-analytic techniques described above and are summarized in Tables 3 through 6 as well as discussed in the text. If there were three or more studies available but fewer than three Pearson *r*s were known for a given NVB, then that NVB is discussed in the text only. An exception to this rule was made for posed encoding skill, which is fully described in the text instead of a table even though all four Pearson *r*s were known. Also, whenever a given NVB had enough studies to merit discussion in the text for either perceived or actual V, we discuss that NVB for both perceived and actual V, for comparative purposes. Finally, there was a residual category of NVBs that were reported too infrequently to be treated in any of the ways just described. These are not formally analyzed in this article.[8]

Perceived V and NVB Study Features

Altogether, there were 120 studies on beliefs about V–NVB relations, described in 79 sources. The mean numbers of male and female perceivers were 43 and 36, respectively, with the total numbers of male and female perceivers in the studies being 3,177 and 2,633, respectively. (The number of perceivers who contributed specifically to the V–NVB correlations was smaller than this because in some of the studies, perceivers were assigned to judge other dimensions besides V, and it was often difficult to know how many were assigned to the different groups. Because of this, we report the total number of perceivers in the study.) The mean numbers of male and female targets (i.e., the people whom perceivers were asked to watch, listen to, interact with, or imagine) were 12 and 6, respectively, with the total numbers of male and female targets being 1,249 and 613, respectively. Of the studies, 16% had only male perceivers, 9% had only female perceivers, and 22% had equal numbers of male and female perceivers (with the remaining studies distributed evenly between the two extremes). Studies were conducted from 1961 to 2002, with a median year of 1985. Table 2 shows that the majority trends for belief studies were to use North American college students as perceivers, to define V in terms of impression ratings of V (mostly ratings of dominance, and this is the term used in this article to describe such ratings), to experimentally manipulate NVB, to use a laboratory setting, to use both same- and opposite-gender stimuli, to use photographs as stimuli, to use dyads as stimuli, and to be a published source.

Perceived V–NVB Relations

Smiling. Thirty-five studies focused on beliefs about V and smiling, yielding 24 Pearson *r*s (see Table 3). The definition of V was role/rank or ratings of dominance. Table 3 reveals the existence of an overall perception that people higher in V smile less than people lower in V. The results were highly heterogeneous, however, and examination of the *Z*s from individual studies revealed a strong polarity: 12 of the 18 *Z*s that were greater than $|1.96|$ were negative (consistent with the overall trend), whereas 6 were positive. Inspection of the coded attributes revealed no distinguishing methodological or sample characteristics. Thus, though the overall trend definitely showed a belief that more smiling conveyed lower V, a subset of studies found the opposite.

Because the same set of photographs was used in 11 of the studies (all published in one article; Keating et al., 1981), another analysis was conducted in which these 11 effects were averaged and treated as one study. The unweighted average Pearson *r* for the set of 14 studies with known Pearson *r*s was now −.07, and the combined *Z* for the known studies was not significant (combined $Z = -.50$). Results were still highly heterogeneous, with 4 of the 14 known *Z*s being significantly negative, and 6 of the 14 known *Z*s being significantly positive. Thus, perceptions (beliefs) about the V–NVB relation were highly variable and often diametrically opposite.

Gazing. For beliefs about V in relation to overall gazing, there were 18 Pearson *r*s located in 29 studies. V was defined as role/rank or ratings of dominance. As Table 3 shows, the distribution was positive, indicating that perceivers judged more gazing to be a sign of higher V. However, the distribution was highly heterogeneous, and all three of the negative Pearson *r*s were very strongly negative (−.49, −.52, and −.64). The first two of these came from studies with the same methodology, in which participants were asked to imagine a person with higher or lower status relative to themselves standing near a coatrack and then to act as they thought they would toward that person (Mehrabian, 1968; Mehrabian & Friar, 1969). Omitting these two uniquely designed studies, as well as the third outlier, the unweighted mean, weighted mean, and median Pearson *r*s for the known results were .25, .20, and .21, respectively (combined $Z = 8.15$, $p < .001$). The distribution was still heterogeneous, $\chi^2(14) = 40.43$, $p < .001$, but much less so than with the negative outliers included.

The contrast comparing published studies with dissertations was significant ($Z = 5.00$, $p < .001$). Dissertations had smaller effects (weighted mean $r = -.09$; four studies) than published studies (weighted mean $r = .20$; 14 studies). However, inspection revealed that this effect was entirely because of one outlier value among the dissertations ($r = -.64$). The other dissertations produced results similar to the published studies.

Raised brows. There were 12 studies on perceived V in relation to raised brows, with 11 known Pearson *r*s. Eleven of the studies (all of those with known Pearson *r*s) used the same set of stimulus photographs (Keating et al., 1981). All of the studies defined V as ratings of dominance. As Table 3 shows, there was a very robust belief that raised brows indicated lower V. The distribution was very heterogeneous in spite of the methodological constancy, perhaps reflecting cultural variations (Keating's 11 samples came from diverse countries).

[8] Examples of NVBs studied too infrequently to discuss are coy look, looking up, mouth distortions, expressions of specific emotions (e.g., disgust), victory gestures, standing up versus sitting down, arms raised, breathiness, whining, chin thrusts, and walking speed.

Table 3
Perceived Relations Between Verticality and Visible Nonverbal Behaviors

Behavior	*k*	*N*	Direction +	−	=	?	r_{unw}	r_{wei}	r_{md}	*Z*	95% CI	Homog.	FD
Smiling													
Known	24	2,878	8	16	0	0	−.20	−.25	−.24	−9.04***	−.29, −.21	253.95***	821
All	35	4,365	12	17	0	6	−.14	−.19	.00	−8.08***			810
Gazing													
Known	18	1,983	14	3	1	0	.12	.10	.19	3.92***	.06, .14	207.15***	84
All	29	3,255	14	3	1	11	.07	.07	.00	3.09***			73
Raised brows													
Known	11	1,797	3	8	0	0	−.38	−.36	−.48	−12.98***	−.41, −.31	294.34***	636
All	12	1,850	3	8	0	1	−.36	−.35	−.37	−12.08***			635
Nodding													
Known	4	438	3	1	0	0	.12	.09	.16	2.10*	.00, .18	9.47*	5
All	8	920	4	1	0	3	.06	.06	.00	1.48†			1
Self touch													
Known/All[a]	4	409	1	3	0	0	−.09	−.15	−.14	−2.56**	−.24, −.06	15.41**	6
Other touch													
Known	13	1,153	11	2	0	0	.21	.23	.21	8.78***	.17, .29	85.04***	385
All	19	1,781	14	2	0	3	.14	.17	.13	7.53***			380
Hand/arm gestures													
Known	5	242	5	0	0	0	.36	.37	.31	5.84***	.25, .49	12.95*	70
All	12	1,017	7	1	0	4	.15	.17	.00	4.13***			64
Postural relaxation													
Known	13	989	5	8	0	0	−.20	−.09	−.32	−3.03***	−.16, −.02	102.92***	31
All	19	1,993	5	10	0	4	−.13	−.05	.00	−2.51**			25
Body/leg shifting													
Known	3	289	3	0	0	0	.16	.10	.16	1.81*	−.04, .24	2.74	1
All	4	310	3	0	0	1	.12	.08	.08	1.56			
Interpersonal distance													
Known	4	340	3	0	1	0	−.21	−.34	−.17	−5.70***	−.43, −.25	20.22***	55
All	14	1,267	3	6	1	4	−.06	−.12	.00	−3.41***			46
Facing orientation													
Known	5	280	3	2	0	0	.07	.10	.31	1.34	−.01, .21	38.79***	
All	11	605	4	6	0	1	.03	.05	.00	.90			

Note. Behavior is not in the table if there were fewer than three known *r*s. *k* of studies for weighted means and homogeneity tests deviates slightly from the stated *k* of studies if the sample *N* was unknown in some studies. Occasionally, a study with an unknown *r* had a known *Z*, which was used in the "All studies" calculations of combined *Z* and file drawer (FD) estimate. For combined *Z*s, *p*s are one-tailed. *k* = number of independent studies; *N* = total number of perceivers across *k* studies; r_{unw} = average *r*, unweighted; r_{wei} = average *r*, weighted by sample size; r_{md} = median *r*; *Z* = combined *Z*; CI = confidence interval (fixed effects); Homog. = homogeneity test (chi-square); Known = studies for which *r* was known; All = all studies, with unknown *r*s assigned a value of 0.
[a] All *r*s were known.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Facial expressiveness/intensity. Perceptions of V were measured in four studies (with two known Pearson *r*s, .42 and .46) on the basis of facial expressiveness or intensity of expression (not shown in Table 3). The *Z* was known in three studies, and the combined *Z* was 4.39 ($p < .001$). More expressive or intense faces were attributed higher V.[9]

Nodding. For beliefs about nodding in relation to V, there were eight studies yielding four Pearson *r*s (see Table 3). V was defined as emergent leadership or ratings of dominance. Perceivers judged more nodding to signify higher V, with a significantly heterogeneous distribution.

Self touch. There were four studies on the perceived relation of V to self touch (all Pearson *r*s were known), with V defined as ratings of dominance. As Table 3 shows, on average, perceivers associated higher V with less self touch, with a significantly heterogeneous distribution.

Other touch. For beliefs about V in relation to nonreciprocal social (i.e., nonintimate) touch, there were 19 studies that yielded 13 Pearson *r*s. The definition of V was personality dominance, role/rank, or ratings of dominance. Table 3 shows that there was a significant positive relation such that perceivers believed more initiation of touch indicated higher V. The results were heterogeneous even when an outlier (a notably negative correlation of −.52) was removed. The contrast comparing published works to dissertations was not significant.

[9] As stated earlier, inferring a belief from correlations on the basis of V ratings can be problematic if several behaviors covary in the stimuli to be judged, a situation that is especially likely when behavior is recorded naturalistically. This was the case for the two perceived V-facial expressiveness studies with known Pearson *r*s. Expressiveness may have been confounded with speaking time (because a face is more likely to be expressive when a person is speaking than listening). Speaking time is a robust predictor of impressions of V (Schmid Mast, 2002).

For beliefs about intimate touches in relation to V, there were five studies, with two unknown Pearson *r*s of opposite signs and three known Pearson *r*s (*r*s = −.21 for holding hands, −.21 for touching the waist, and .21 for touching the face; each $Z > |1.96|$) (not shown in Table 3). The latter three results were for different groups reported in one study, and therefore conditions were constant except for the specific kind of touching shown to the perceivers. Thus, overall, there was some evidence that V varies with intimate other touch, but it also seems "intimate" touch may not be an internally consistent category.

Hand/arm gestures. For beliefs about the relation of V to hand and arm gestures, there were 12 studies with five Pearson *r*s. The definition of V was emergent leadership or ratings of dominance. Table 3 shows that perceivers believed that more hand and arm gestures indicated higher V, with a heterogeneous distribution of Pearson *r*s. Because hand and arm gestures are closely tied to speech (Knapp & Hall, 2005), and talking more is believed by perceivers to indicate higher V (Schmid Mast, 2002), the present finding may reflect an association between speaking and gesturing in the stimuli that were judged. No study controlled for speaking time when relating gestures to perceptions of V (see Footnote 9).

Openness. Beliefs about bodily openness and V were investigated in five studies, with V defined as role/rank or ratings of dominance. Two studies yielded Pearson *r*s (*r*s = .22 and .18, *Z*s = 1.65 and 1.16), and the other three had unknown, nonsignificant Pearson *r*s (results not shown in Table 3). The combined *Z* for the two known Pearson *r*s was 1.99 ($p < .05$). Thus, there is evidence for the belief that higher V goes with more bodily openness. A study published after our search period also revealed such a relation, based on naïve participants' ratings of a confederate ($r = .29$, $Z = 2.79$; Tiedens & Fragale, 2003). The combined *Z* over the three studies with known Pearson *r*s (the two given above, plus this one) was 3.23 ($p < .001$) and across all six studies (estimating unknown *Z*s as zero) was 2.29 ($p < .01$).

Postural relaxation. As Table 3 shows, there were 19 studies of beliefs about V and postural relaxation, which yielded 13 Pearson *r*s. The definition of V was role/rank or ratings of dominance. Overall, higher V was associated with less relaxed (meaning more erect, forward, or tense) postures, but the distribution was extremely heterogeneous, with strong and significant effects in both directions (five significantly negative, three significantly positive). Inspection of methodology revealed that the two most positive results came from the "coat-rack" studies that also showed unusual results for gaze beliefs. Of most interest, five of the substantially negative findings were for rated leadership on the basis of actual interaction. This suggests that a more erect (less relaxed) posture connotes social potency under certain conditions. The substantially positive findings were for impressions of dominance on the basis of viewing videotapes or photographs of strangers and for the coat-rack studies, as mentioned above. These disparate results suggest that the local context determines whether erect posture might be seen either as nervous and polite (and therefore possibly interpreted as a behavior reflecting low V) or as reflecting proud, confident bearing (and therefore suggestive of high V).

The contrast between published studies and dissertations was significant ($Z = 2.55$, $p < .05$). Published studies showed no relation on average (weighted mean $r = .01$, nine studies), whereas dissertations showed strongly negative results (weighted mean $r = -.43$, three studies). All three of the dissertation results were among those based on rated leadership after actual interaction (see above).

Body/leg shifting. Beliefs about V in relation to shifting one's body or legs were examined in four studies (yielding three Pearson *r*s). V was defined as ratings of dominance. There was a weak suggestion that more shifting of the body or legs was associated with higher perceived V (see Table 3).

Moving feet. In only one study was moving of the feet examined in relation to perceived V; it was nonsignificant, with an unknown Pearson *r*.

Interpersonal distance. There were 14 studies addressing beliefs about the relation of V to interpersonal distance, yielding four Pearson *r*s (see Table 3). The trends indicated that smaller distances were perceived as indicating higher V. The four known Pearson *r*s were very heterogeneous.

Facing orientation. Beliefs about V in relation to how directly one person faces another were examined in eleven studies, yielding five Pearson *r*s. V was defined as role/rank or ratings of dominance. As Table 3 shows, there was no overall evidence of a belief that V and facing orientation are related. However, the distribution was highly heterogeneous; all of the Pearson *r*s were statistically significant but went in divergent directions. The overall effect was clearly moderated by study methodology. The three positive Pearson *r*s (.38, .35, and .31) came from studies in which perceivers made dominance ratings of stimuli they viewed, whereas the two negative Pearson *r*s (−.40 and −.31) were from studies in which people imagined their own behavior toward a person of higher or lower V. Thus, one's imagination of one's own behavior yields a result opposite to the impression gained when observing others' behavior.

Vocal variability. Beliefs about the relation of V to vocal variability were investigated in nine studies, yielding seven Pearson *r*s. The definition of V was SES or ratings of dominance. As Table 4 shows, there was a clear finding: Perceivers associated higher V with more vocal variability. The distribution was significantly heterogeneous, however, and inspection revealed that the largest effect ($r = .77$) came from a study in which actors deliberately manipulated the variability in their vocal tones. This study's larger than typical effect size probably occurred because the deliberate manipulation produced more extreme variation than occurred in studies using more naturalistic voice samples. Omitting this study left an unweighted mean effect of .16, a weighted mean effect of .12, a combined *Z* of 2.82 ($p < .01$), and a homogeneity chi-square of 13.32 ($p < .05$). Thus, though the effect became weaker, perceivers still rated more variable voices as higher in V, with most but not all of the heterogeneity attributable to the outlier study.

Loud voice. Beliefs about the relation of V to loudness were investigated in 17 studies, yielding seven Pearson *r*s. The V definition was rated dominance. As Table 4 shows, there was strong evidence that a louder voice was perceived to be associated with higher V. The smaller average Pearson *r*s when unknown Pearson *r*s were included as 0 are definitely an underestimate because most of the unknown Pearson *r*s were highly significant and therefore obviously not $r = 0$. The distribution was highly heterogeneous, however. Although one of the largest Pearson *r*s was from the study mentioned in the previous section that had

Table 4
Perceived Relations Between Verticality and Vocal Nonverbal Behaviors

Behavior	*k*	*N*	Direction +	−	=	?	r_{unw}	r_{wei}	r_{md}	*Z*	95% CI	Homog.	FD
Vocal variability													
Known	7	950	5	2	0	0	.27	.24	.18	7.32***	.16, .32	78.17***	99
All	9	1,334	5	2	0	2	.22	.18	.04	5.64***			97
Loudness													
Known	7	862	7	0	0	0	.62	.47	.44	8.05***	.39, .55	133.78***	138
All	17	1,454	14	0	0	3	.29	.25	.00	7.45***			332
Interruptions													
Known	5	516	5	0	0	0	.56	.61	.59	11.93***	.52, .70	11.51*	258
All	6	814	5	0	0	1	.48	.57	.56	10.89***			257
Pausing/latency to speak													
Known/All[a]	3	296	0	3	0	0	−.62	−.78	−.39	−8.03***	−.94, −.62	35.39***	68
Rate of speech													
Known	12	1,338	7	4	1	0	.18	.09	.22	3.78***	.03, .15	39.70***	60
All	20	1,882	10	7	1	2	.11	.06	.00	2.75**			54
Pitch													
Known	6	651	1	5	0	0	−.33	−.10	−.24	−3.94***	−.19, −.01	35.02***	28
All	7	775	1	5	0	1	−.28	−.10	−.14	−3.65***			27
Vocal relaxation													
Known	3	219	3	0	0	0	.28	.33	.37	3.89***	.18, .48	2.21	14
All	11	889	5	4	0	2	.08	.09	.00	.67			

Note. Behavior is not in the table if there were fewer than three known *r*s. *k* of studies for weighted means and homogeneity tests deviates slightly from the stated *k* of studies if the sample *N* was unknown in some studies. Occasionally, a study with an unknown *r* had a known *Z*, which was used in the "All studies" calculations of combined *Z* and file drawer (FD) estimates. For combined *Z*s, *p*s are one-tailed. *k* = number of independent studies; *N* = total number of perceivers across *k* studies; r_{unw} = average r, unweighted; r_{wei} = average r, weighted by sample size; r_{md} = median *r*; *Z* = combined *Z*; CI = confidence interval (fixed effects); Homog. = homogeneity test (chi-square); Known = studies for which *r* was known; All = all studies, with unknown *r*s assigned a value of 0.
[a] All *r*s were known.
* $p < .05$. ** $p < .01$. *** $p < .001$.

actors deliberately vary their vocal qualities, some other substantially large Pearson *r*s came from more naturalistic studies.

Interruptions. For beliefs about V in relation to interruptions, there were six studies, five of which produced Pearson *r*s. V was defined as ratings of dominance. Table 4 indicates that perceivers rated more interruptions as a sign of higher V, with a significantly heterogeneous distribution.

Overlaps. There was only one study of perceived V in relation to overlaps ($r = .20$, $Z = .77$; not shown in Table 4). Thus, one cannot conclude there is a relation.

Pausing/latency to speak. There were three studies of perceived V in relation to pausing/latency to speak, all with known Pearson *r*s. As Table 4 shows, shorter latency and less pausing were rated as higher in V. The distribution was highly heterogeneous.

Filled pauses. Filled pauses in relation to perceived V were examined in two studies, one of which produced an effect ($r = -.23$, $Z = -3.15$; not shown in Table 4). A lower frequency of filled pauses was associated with higher V.

Back-channel responses. Back-channel responses, also called listener responses, are short interjections such as "uh-huh" and "I see," made by a speaker who is not currently holding the floor; back-channel responses are generally used to facilitate or support the speech of the other person (Knapp & Hall, 2005). Back-channel responses can include smiling and nodding, but here we consider only vocal responses. There was only one study in which beliefs about back-channel responses in relation to V were measured (Pearson *r* unknown and nonsignificant; not in Table 4).

Laughter. Two studies examined perceived V (defined as ratings of dominance) in relation to laughter (*r*s = .47 and .15; *Z*s = 2.97 and 1.66; combined $Z = 3.27$, $p < .01$; not shown in Table 4). More laughter was associated with higher rated V.

Speech errors. Perceived V in relation to speech errors was examined in one study ($r = -.15$, $Z = -1.66$; not shown in Table 4). Thus, there was a weak effect showing that fewer speech errors were perceived as higher in V.

Rate of speech. Table 4 shows that there were 20 studies of perceived V in relation to rate of speech, yielding 12 Pearson *r*s. V was defined as SES or ratings of dominance. Overall, the trend was significantly positive, indicating that faster speech was perceived as higher in V. The distribution was significantly heterogeneous. Of most interest, Korean perceivers were used in five of the studies, and for these studies, the trend was negative, meaning that faster speech was perceived as lower in V; four of the five studies had negative Pearson *r*s (though only one was known, $r = -.13$), with one of these being significantly negative at $p < .05$. Thus, it appears that there is a cultural difference in beliefs about V and rate of speech such that perceivers from Western countries (the United States, Europe, and Australia in these studies) have a different belief about fast speech and V than Korean perceivers have. The contrast comparing published works to dissertations was not significant.

Vocal pitch. Table 4 shows that there were seven studies of perceived V in relation to vocal pitch, yielding six Pearson *r*s. V was defined as ratings of dominance. Lower voices were perceived as higher in V, with a significantly heterogeneous distribution.

Because of the stereotypical association of men with V and the fact that men's voices are in fact lower in pitch than women's, we inspected the studies for evidence that the negative Pearson *r*s may be an artifact of the speaker's gender. This was not the case; in the three studies with the largest negative Pearson *r*s, either the results were for one gender of speaker only or the authors said there was no gender difference in pitch or rated dominance.

Vocal relaxation. There were 11 studies on beliefs about V and vocal relaxation, which yielded three Pearson *r*s (see Table 4). The definition of V was SES or ratings of dominance. For known Pearson *r*s only, there was clear evidence that more vocal relaxation was associated with higher V. However, considering all 11 studies, the results were nearly split between those with negative versus positive effects, with evidence that culture of perceiver was a moderator. The smallest positive Pearson *r* ($r = .09$) and all four of the negative relations came from samples of Korean perceivers (two of which had significantly negative relations, though the exact Pearson *r*s were unknown). Thus, the stereotype appears to be different in the United States versus the Korean culture; for U.S. perceivers, more vocal relaxation is seen as indicating higher V, whereas the opposite tended to be true for Korean perceivers.

Posed encoding skill. There were no studies on beliefs about V in relation to posed nonverbal encoding skill.

Actual V and NVB Study Features

There were 91 studies of actual V–NVB relations, described in 68 sources. Male and female participants were used with equal frequency (mean *N* for men = 36, mean *N* for women = 37). The mean total *N* was 74 (range = 8–562). Altogether, 2,957 male and 2,841 female participants were included. Approximately equal numbers of studies used men only (22%), women only (23%), and men and women in equal proportion (28%). Studies were conducted from 1937 to 2002, with a median year of 1981. Table 2 shows that the majority trends for studies of actual V–NVB relations were to use North American college students as participants, to define V predominantly (and equally) in terms of personality and role/rank, to measure V (as opposed to experimentally manipulating it), to use a laboratory setting, to use both same- and opposite-gender participant groups, to observe participants interacting with real people (as opposed to people in the investigator's employment), to observe participants in dyads, to use a variety of types of task in roughly equal proportion, and to be a published source. (By definition, NVB was measured by independent observers.)

Actual V–NVB Relations

Smiling. For the relation of actual V to smiling, there were 34 studies yielding 22 Pearson *r*s. The definition of V was personality dominance, role/rank, or SES. Table 5 reveals that, overall, V had no relation to smiling. However, the results were highly heterogeneous, with three studies being notably extreme (*r*s = .52, .52, and −.54). Excluding these studies made essentially no change in the central tendency statistics, though it reduced the heterogeneity to nonsignificance, $\chi^2(18) = 18.99$, $p > .30$. The contrasts for V definition (personality vs. role/rank, leaving out social class because of too few studies) and publication type (published works vs. dissertations) were not significant.

A potential moderator was the type of smile. Hecht and LaFrance (1998) scored Duchenne smiles (often called enjoyment smiles; Ekman, Davidson, & Friesen, 1990) separately from non-Duchenne smiles (often called social smiles) and found no V effect for either kind. Keltner, Young, Heerey, Oemig, and Monarch (1998) scored only Duchenne smiles and found that high-V people used more of these smiles than did low-V people. Thus, the data are unclear on whether type of smile is a moderator.

A definition of V not included in the quantitative summaries discussed thus far is participants' self-ratings of how much V (dominance, typically) they felt after having been in an interaction. Overall, in the nine such studies, there was no relation with smiling (unweighted mean over eight known *r*s = −.02), but the results were very discrepant, with one significant ($p < .05$) positive result and two marginally significant ($p < .10$) negative results.

Gazing. For the relation of actual V to overall gazing,[10] there were 25 studies that yielded 11 Pearson *r*s. The definition of V was personality dominance, role/rank, or SES. Table 5 shows that there was no overall relation (a conclusion that is bolstered by the large number of unknown and nonsignificant results, presuming that these tended to be negligible in magnitude and not reported for that reason). The distribution was significantly heterogeneous.

The contrast for V definition was not significant. The contrast for publication type was significant ($Z = 1.96$), showing that more positive results were obtained in published studies (weighted mean $r = .07$, seven studies) than in dissertations (weighted mean $r = -.07$, four studies).

Raised brows. The relation of actual V to raised brows was examined in four studies (three with known *r*s). V was defined as personality or role/rank. The overall effect was negligible (see Table 5).

Facial expressiveness/intensity. Actual V (defined as role/rank or SES) in relation to facial expressiveness was examined in two studies (*r*s = .33 and .12, *Z*s = 2.16 and 1.12, respectively; not shown in Table 5). The combined *Z* was 2.32 ($p < .01$). Higher V people had more expressive faces. As noted for the perceived V–NVB relations, this result could be because of the confounding effect of speaking time on expressiveness (see Footnote 9).

Nodding. Table 5 presents results for the relation of actual V to nodding. There were five Pearson *r*s available in 10 studies. The V definition was personality dominance, role/rank, or SES. There was no overall evidence for a relation, with a heterogeneous distribution of effects.

Self touch. There were 20 studies on the relation of actual V to self touch, with six available Pearson *r*s. V was defined as personality dominance or role/rank. Self touch could be overall or to the head or body specifically (there were not enough studies to make such distinctions in the analysis). As Table 5 shows, there was no evidence of a V effect, and the distribution was homogeneous.

Other touch. For the relation of nonreciprocal social touch (in contrast to intimate touch, see below) to actual V, there were eight studies producing three Pearson *r*s. V was defined as role/rank or SES. As Table 5 shows, there was no evidence for an overall V

[10] Because we did not include studies on the VDR, it follows that we also excluded studies on the VDR's ingredients, namely, gazing while listening and gazing while speaking.

Table 5
Relations Between Actual Verticality and Visible Nonverbal Behaviors

Behavior	*k*	*N*	Direction +	Direction −	Direction =	Direction ?	r_{unw}	r_{wei}	r_{md}	*Z*	95% CI	Homog.	FD
Smiling													
Known	22	1,702	8	14	0	0	−.02	−.03	−.04	−.95	−.09, .03	48.15***	
All	34	2,422	8	14	0	12	−.01	−.02	.00	−.76			
Gazing													
Known	11	607	4	6	1	0	−.02	−.01	−.06	−.42	−.09, .07	25.43**	
All	25	1,231	6	6	1	12	−.01	.00	.00	−.28			
Raised brows													
Known	3	88	1	2	0	0	−.03	−.04	−.06	−.31	−.25, .18	.86	
All	4	126	1	2	0	1	−.02	−.03	−.03	−.27			
Nodding													
Known	5	288	3	2	0	0	.04	.06	.03	.63	−.05, .17	11.88*	
All	10	616	3	2	0	5	.02	.03	.00	.44			
Self touch													
Known	6	405	2	4	0	0	−.01	.00	−.04	.05	−.10, .10	4.73	
All	20	729	4	4	0	12	.00	.00	.00	.03			
Other touch													
Known	3	241	1	2	0	0	−.06	.03	−.02	.10	−.10, .16	5.85	
All	8	754	3	3	0	2	−.02	.01	.00	.08			
Hand/arm gestures													
Known	9	636	5	4	0	0	.00	.02	.05	.43	−.06, .10	21.86*	
All	17	992	6	4	0	7	.00	.01	.00	.32			
Openness													
Known	8	380	5	3	0	0	.12	.13	.06	2.31*	.03, .23	6.35	8
All	14	684	5	3	0	6	.07	.08	.00	1.75*			32
Postural relaxation													
Known	10	453	7	3	0	0	.04	.02	.05	.53	−.08, .12	11.02	
All	18	921	7	3	0	8	.02	.01	.00	.40			
Interpersonal distance													
Known	11	1,098	2	8	1	0	−.16	−.17	−.22	−4.46***	−.24, −.20	22.47*	70
All	15	1,331	2	8	1	4	−.12	−.14	−.08	−3.82***			66

Note. Behavior is not in the table if there were fewer than three known *r*s. *k* of studies for weighted means and homogeneity tests deviates slightly from the stated *k* of studies if the sample *N* was unknown in some studies. Occasionally, a study with an unknown *r* had a known *Z*, which was used in the "All studies" calculations of combined *Z* and file drawer (FD) estimates. For combined *Z*s, *p*s are one-tailed. *k* = number of independent studies; *N* = total number of participants across *k* studies; r_{unw} = average r, unweighted; r_{wei} = average r, weighted by sample size; r_{md} = median *r; Z* = combined *Z*; CI = confidence interval (fixed effects); Homog. = homogeneity test (chi-square); Known = studies for which *r* was known; All = all studies, with unknown *r*s assigned a value of 0.
* $p < .05$. ** $p < .01$. *** $p < .001$.

effect. Though the homogeneity test was not significant, the *Z* values varied substantially, with significant and marginally significant studies showing both positive and negative Pearson *r*s. Inspection revealed no evident patterns for different types of touch or other study attributes. Though not relevant to the between-studies variation, one study showed substantial variation across types of touch (Hall, 1996). In that study (of academics interacting at professional meetings), the high-status person in a dyad did not touch the low-status person more overall, but the low-status person was more likely to initiate formal touches (including handshaking), whereas the high-status person was more likely to initiate less formal touches, especially to the arm or shoulder. Thus, the kind of touch appears to moderate the relation of social touch to actual V.

There was only one study on intimate other touch in relation to actual V ($r = .14$, not significant; not shown in Table 5).

Hand/arm gestures. For the relation of actual V to hand and arm gestures used in conversation, there were 17 studies yielding nine Pearson *r*s. The definition of V was personality dominance, role/rank, SES, or own-sex-typed topic. As Table 5 shows, there was no overall tendency for people higher in V to engage in more conversational gesturing. However, the distribution of Pearson *r*s was heterogeneous. Examination of the most disparate results suggested a moderating effect of task. In two studies with the strongest positive Pearson *r*s (*r*s = .32 and .29, *Z*s = 1.97 and 2.25), participants were engaged in conversation, whereas in the study with the negative Pearson *r* ($r = -.46$, $Z = -1.86$), college students were interviewed by an equal or high-status interviewer. As we suggested for perceived V-hand gesture results (and for facial expressiveness, see Footnote 9), speaking time may play a role in this association in that the person who speaks more should produce more hand gestures (Hall & Friedman, 1999; Knapp & Hall, 2005). Consistent with this reasoning, in one of the two studies with the strong positive Pearson *r*s, higher V individuals spoke more than their lower V counterparts (the other positive Pearson *r* study did not measure speaking time), whereas in the study with the strong negative Pearson *r*, higher V individuals spoke less than their lower V counterparts. Thus, the use of hand and arm gestures in high- and low-V individuals may be a by-product of how much each is speaking. However, the study with the negative Pearson *r* was also based on female Japanese partic-

ipants, so other explanations cannot be ruled out. Excluding this strongly negative result, the combined *Z* for the eight remaining known Pearson *r*s was still not significant (combined $Z = 1.12$) and was still heterogeneous, $\chi^2(7) = 18.14$, $p < .05$. The contrasts for V definition (personality vs. role/rank) and publication type (published works vs. dissertations) were not significant.

Openness. There were 14 studies on the relation of bodily openness (including both arms and legs) to actual V, yielding eight Pearson *r*s. The definition of V was personality dominance or role/rank. Table 5 indicates that there was a positive relation showing that more openness went with higher V, and the eight known Pearson *r*s were homogeneous.

Postural relaxation. Postural relaxation was coded in 18 studies (yielding 10 Pearson *r*s), and, as Table 5 shows, the results suggested no relation overall. The definition of V was personality dominance or role/rank. The distribution was homogeneous. The contrasts for V definition (personality vs. role/rank) and publication type (published works vs. dissertations) were not significant.

Body/leg shifting. The relation of actual V to shifting one's body or legs was examined in 11 studies. The definition of V was personality dominance or role/rank. Only two correlations were available (*r*s = −.05, −.21; *Z*s = −.38, −1.10; not shown in Table 5). Thus, there was no evidence for a relation.

Moving feet. Four studies, all using personality dominance as the definition of actual V, measured foot movements. None showed a significant effect, and only one effect was known ($r = .10$, $Z = .65$; not shown in Table 5).

Interpersonal distance. For the relation of actual V to the distance between individuals, there were 15 studies that yielded 11 Pearson *r*s. The definition of V was personality dominance, role/rank, or SES. As Table 5 shows, higher V individuals interacted with smaller distances. In addition to the overall negative trend, there was significant heterogeneity.

A contrast performed for V definition (three social class studies vs. seven role/rank studies) was significant ($Z = 2.36$, $p < .05$; weighted mean *r* for social class = −.30, weighted mean *r* for role/rank = −.13). Thus, the tendency for people higher in V to use closer interpersonal distances was stronger when V was defined as social class than as role/rank. However, the one study in which V was defined in terms of personality revealed the strongest result of all ($r = -.47$, $p < .05$). The combined probabilities for both social class and role/rank were significant ($Z = 3.65$ and 2.28, respectively), whereas the homogeneity test was significant for role/rank, $\chi^2(6) = 14.17$, $p < .05$, but not for social class, $\chi^2(2) = 0.86$.

Facing orientation. For the relation of actual V to how directly one person faces another during interaction, there were seven studies but only one known Pearson *r*, which was .09 (one more was positive and unknown; not shown in Table 5). Both were nonsignificant. Thus, there was no evidence of a relation.

Vocal variability. The relation of actual V (defined as SES) to vocal variability was investigated in one study and showed that higher V went with less vocal variability ($r = -.27$, $Z = -2.82$, $p < .01$; not shown in Table 5).

Loud voice. The relation of actual V to loud voice was investigated in seven studies, with V defined as personality dominance or SES. There were three Pearson *r*s, and as Table 6 shows, the trend was significantly positive and the distribution was homogeneous. One of the unknown Pearson *r*s had a *Z* of −2.57, which was not sufficient to reverse the significant combined *Z* for all seven studies together. Of most interest, however, that study was for SES: White-collar participants spoke more softly than blue-collar participants. Thus, the V definition may be a moderator of this effect in that people low in personality dominance may speak relatively softly, but people low in social class may speak relatively loudly.

Interruptions. For interruptions, there were 26 studies on the relation with actual V, yielding 19 Pearson *r*s . The definition of V was personality dominance or role/rank. Table 6 shows that the effects were significantly positive, such that people higher in V interrupted more. However, the distribution was highly heterogeneous.

One potential moderator involved the distinction between successful and unsuccessful interruptions; the person higher in V may be particularly successful in taking the floor from a partner but may not differ in interruption attempts that fail. Some studies made this distinction. Results for successful interruptions yielded a mean unweighted Pearson *r* of .22 (13 studies; combined $Z = 4.56$, $p < .001$), whereas results for partially successful and unsuccessful interruptions yielded a mean unweighted Pearson *r* of −.14 (four studies; combined $Z = -2.28$, $p < .05$). These results indicate that people higher in V made more successful but fewer partially successful and unsuccessful interruptions than people lower in V. The mean unweighted Pearson *r* for studies that did not make this distinction, $r = .07$ (nine studies), is consistent with what one would expect if both kinds of interruptions are mixed together. Contrasts were not performed because these three groups of results were not independent from each other.

The definition of V was also a moderator. Studies of personality dominance were nearly all positive (weighted mean $r = .12$, 13 studies), with a significant combined probability ($Z = 3.86$, $p < .001$), meaning that people with a more dominant personality interrupted more than people with a less dominant personality. However, results for role/rank were more mixed in direction (weighted mean $r = -.09$, six studies), with a nonsignificant combined probability ($Z = -.74$). A contrast between these two groups of studies was significant (contrast $Z = 3.56$, $p < .001$), but both groups of studies remained significantly variable, with $\chi^2(5) = 15.48$, $p < .01$, for personality and $\chi^2(12) = 24.50$, $p < .02$, for role/rank. For role/rank, examples of studies with negative results involved patients interacting with their physicians, subordinates interacting with managers in a mock business, and college students interacting with their college mentors. In such situations, subordinate people may interrupt because they have a need for information. The contrast between published works and dissertations was not significant.

Overlaps. The relation of actual V to conversational overlaps was investigated in seven studies, defined as one person starting to speak before the other finishes his or her turn but without evident intent to steal the floor. There were five Pearson *r*s, with the definition of V being personality dominance or role/rank. Table 6 reveals highly heterogeneous effects with no overall trend. In this case, the disparities are especially intriguing given that four of the five known results were statistically significant (in opposite directions) and one was marginally significant, with the widest disparity being between the study of physicians and patients described above (patients overlapped more; $r = -.55$, $Z = -4.08$) and the study of students and mentors described above ($r = .80$, $Z = 2.22$;

Table 6
Relations Between Actual Verticality and Vocal Nonverbal Behaviors

Behavior	*k*	*N*	Direction +	−	=	?	r_{unw}	r_{wei}	r_{md}	*Z*	95% CI	Homog.	FD
Loudness													
Known	3	545	3	0	0	0	.24	.24	.24	5.32***	.16, .32	.29	28
All	7	798	4	1	0	2	.11	.17	.00	2.51**			9
Interruptions													
Known	19	1,108	13	6	0	0	.13	.04	.17	2.78**	−.02, .10	50.17***	35
All	26	1,387	14	7	0	5	.09	.03	.01	2.37**			28
Overlaps													
Known	5	370	3	2	0	0	.24	.06	.39	.10	−.06, .18	80.00***	
All	7	410	3	2	0	2	.17	.05	.00	.08			
Pausing/latency to speak													
Known	4	134	2	2	0	0	.04	−.06	−.04	−.07	−.24, .12	6.75†	
All	11	476	2	4	0	5	.01	−.02	.00	−.86			
Back-channel responses													
Known	5	358	2	3	0	0	.02	.03	−.23	−.50	−.07, .13	63.96***	
All	10	545	2	3	0	5	.01	.02	.00	−.35			
Speech errors													
Known	4	295	2	2	0	0	−.04	.02	−.02	−.07	−.10, .14	14.67**	
All	6	327	2	2	0	2	−.02	.01	.00	−.06			
Rate of speech													
Known	3	485	1	2	0	0	−.01	−.06	−.11	−.68	−.15, .03	6.14*	
All	8	682	3	3	0	2	.00	−.05	.00	.28			

Note. Behavior is not in the table if there were fewer than three known *r*s. *k* of studies for weighted means and homogeneity tests deviates slightly from the stated *k* of studies if the sample *N* was unknown in some studies. Occasionally, a study with an unknown *r* had a known *Z*, which was used in the "All studies" calculations of combined *Z* and file drawer (FD) estimates. For combined *Z*s, *p*s are one-tailed. *k* = number of independent studies; *N* = total number of participants across *k* studies; r_{unw} = average r, unweighted; r_{wei} = average r, weighted by sample size; r_{md} = median *r*; *Z* = combined *Z*; CI = confidence interval (fixed effects); Homog. = homogeneity test (chi-square); Known = studies for which *r* was known; All = all studies, with unknown *r*s assigned a value of 0.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

mentors overlapped more). Possibly, the direction of overlaps is determined more by which party is the most eager to speak than which has higher V.

Pausing/latency to speak. As Table 6 shows, there were 11 studies on the relation of actual V to how much or how long one pauses or hesitates, either during speech or as one is beginning to speak (speech latency); four studies yielded Pearson *r*s. The definition of V was personality dominance, role/rank, or SES. The results showed no overall trend, and the distribution was marginally significantly heterogeneous. The one significant result (Pearson *r* unknown, $Z = -2.57$) was for SES; white-collar participants spoke with fewer hesitations than blue-collar participants. However, the largest positive Pearson *r* ($r = .44$, $Z = 1.60$) showed that Japanese interviewees lower in V than the interviewer had shorter speech latencies than did interviewees whose V was equal to that of their interviewers. Such disparity may point to V definition as a moderator; in the context of social class, fewer hesitations may be a sign of greater self-confidence among higher SES individuals, whereas in the context of an interview, fewer hesitations may signify more eagerness to respond on the part of lower V interviewees.

Filled pauses. The relation of filled pauses to actual V (defined as personality dominance or role/rank) was examined in six studies. Five had unknown Pearson *r*s and were nonsignificant, but the sixth had a Pearson *r* of −.35 ($Z = -2.25$; not shown in Table 6), meaning that people higher in V used fewer filled pauses. Overall, however, one would have to conclude that there is not much evidence for a relation.

Back-channel responses. Back-channel responses were studied in relation to actual V in 10 studies that yielded five Pearson *r*s (see Table 6). The definition of V was personality dominance, role/rank, or SES. Overall, there was no relation. However, the notable heterogeneity comes from the fact that the study of physicians and patients described above produced a strongly divergent result from the other known results. In that study, physicians (high V) back channeled a great deal more than patients (low V) ($r = .77$, $Z = 3.30$). Three of the four remaining Pearson *r*s showed that people lower in V used more back-channel responses, and together those four studies produced a negative mean unweighted Pearson *r* of −.24 and a significant combined *Z* of −2.21 ($p < .05$). Therefore, it seems likely that contextually based motivational differences can override the simple fact of a difference in V. Physicians in that study may have felt a stronger desire to solicit input from their conversation partner (a function served by emitting back-channel responses such as "uh-huh") than did the higher V individuals in the remaining studies.

Laughter. The relation of laughter to actual V (defined as personality dominance, role/rank, or SES) was investigated in eight studies, with one known Pearson *r* ($r = .16$, $Z = 1.62$; not shown in Table 6). The remaining Pearson *r*s were of unknown magnitude and mixed direction. Thus, there was no overall evidence for a relation.

Speech errors. Speech errors in relation to actual V (defined as personality dominance or SES) were examined in six studies, with four known Pearson *r*s (see Table 6). The results were highly variable, with no overall trend.

Rate of speech. The relation of speech rate to actual V was investigated in eight studies (with three Pearson *r*s), defined as personality dominance, role/rank, or SES. As Table 6 shows, there was no overall evidence that speech rate varies with actual V, but the distribution was significantly variable.

Vocal pitch. The relation of actual V to vocal pitch was examined in three studies, with two known Pearson *r*s (*r*s = −.10 and .00, *Z*s = −1.87 and 0.00). Thus, there was little evidence of a relation (combined *Z* for all three studies = −1.08; not in Table 6).

Vocal relaxation. The relation of actual V to rated vocal relaxation was examined in two studies; only one Pearson *r* was available (*r* = .29), but *Z*s were available for both (*Z*s = 1.97 and 3.30; combined *Z* = 3.73, $p < .001$; not in Table 6). The V definition was role/rank or SES. Thus, the limited evidence suggested that people with higher V spoke with more relaxed voices.

Posed encoding skill. In four studies (117 participants), participants were asked to convey certain meanings using nonverbal cues, and these were scored for accuracy of communication (results not shown in a table). V was defined as personality dominance, and the communication channels were standard-content vocal cues of emotion or facial expressions combined with standard-content vocal cues of emotion. All studies yielded Pearson *r*s, with all four studies being positive in sign, indicating that higher V went with greater encoding skill. The unweighted and weighted mean Pearson *r*s were .34 and .31, respectively, and the median Pearson *r* was .29. The combined *Z* was 3.22 ($p < .001$), and the 95% confidence interval was .10–.52. The results were homogeneous, $\chi^2(3) = 1.69$, and the file drawer estimate was 11. Thus, the available evidence suggests that higher V is associated with a greater ability to convey emotions accurately through face and/or voice.

Profile Match Between Perceived and Actual Effects

The foregoing presentation of effect sizes for perceived and actual V–NVB relations is clear in showing that, on average, the perceived effects were stronger than the actual effects. However, it is possible that the effect sizes for perceived and actual relations were positively correlated across behaviors. If the perceived effects have a kernel of truth, as some stereotypes do (e.g., gender stereotypes; Briton & Hall, 1995; Hall & Carter, 1999; Swim, 1994), then perceivers may have an accurate sense of the patterning of the V–NVB effects (their directions and relative magnitudes) even though their beliefs are exaggerated in magnitude.

To examine this possibility, we correlated the perceived with the actual effects (known Pearson *r*s only) using the unweighted mean Pearson *r*s from Tables 3–6 as well as the unweighted mean Pearson *r*s reported in the text (or single Pearson *r*s if this was all that was available) for behaviors not shown in the tables.[11] For actual interruptions, we entered the mean Pearson *r* for successful interruptions, as this variable corresponded best to the perceived studies. As Table 7 shows, the correlation between perceived and actual Pearson *r*s for the 24 NVBs was significantly positive (see Table 7 *Note* for the list of behaviors).

Because some of the NVBs were arbitrary in their coding polarity (e.g., "raised brows" could have been called "lowered brows" with the signs of the Pearson *r*s reversed), we removed such behaviors, leaving only NVBs that were coded as amount of a given behavior so that higher values always meant the same thing (i.e., more of the behavior in question). For these 14 NVBs (identified in the Table 7 *Note*), the correlation was also significantly positive.

Table 7
Profile Match Between Actual and Perceived Verticality–Nonverbal Behavior Relations

Nonverbal behaviors (NVBs)	*N*	*r* between perceived and actual effect sizes[a]
For which effect sizes (*r*) were available for both perceived and actual V	24[b]	.48*[c]
Subsets of these 24 NVBs		
Coded as amount of behavior	14[d]	.56*
Significant for both perceived and actual V	8[e]	.75*
Coded as amount of behavior and significant for both perceived and actual V	4[f]	.87†

Note. Amt = NVB coded as amount of behavior; *N* = number of nonverbal behaviors in analysis; V = verticality.
[a] Unweighted mean known *r*s, with Fisher *z* transformation, were the basis of this analysis. [b] The behaviors were smiling (Amt), gazing (Amt), nodding (Amt), self touch (Amt), other touch (Amt), gestures (Amt), body/leg shifting (Amt), vocal variability (Amt*), interruptions (Amt*), overlaps (Amt), speech errors (Amt), facial expressiveness (Amt*), filled pauses (Amt*), laughs (Amt), raised brows, bodily relaxation, interpersonal distance (*), facing orientation, loudness (*), latency/pausing, rate, pitch, vocal relaxation (*), bodily openness (*). [c] *p* values are two-tailed. [d] These studies are identified by "Amt" in note b. [e] These studies are identified with an asterisk in note b. [f] These studies are identified by "Amt" and an asterisk in note b.

Yet another way to examine profile match between perceived and actual effects was to include only those studies for which both perceived and actual effects were significantly greater than zero according to results reported in Tables 3–6 or in the text. As Table 7 shows, for these eight NVBs (identified in the Table 7 *Note*), the correlation was again significantly positive and substantially larger. As a final way to examine this question, we limited the analysis to only those four behaviors (identified in the Table 7 *Note*) that were scored as amount of behavior *and* were significant for both perceived and actual effects. This correlation was large in magnitude but only marginally significant because of the small number of behaviors.

This analysis of profile match indicated that perceivers' ideas about V–NVB relations were significantly accurate when accuracy was defined as covariation between perceived and actual effects.

Discussion

We undertook a comprehensive analysis of NVB in relation to the V construct. We accumulated results for people's beliefs/perceptions about the association of V to NVB, typically measured by asking perceivers to rate their impressions of V on the basis of presentations of nonverbal cues, as well as results for the actual association of V to NVB on the basis of studies that measured V

[11] The same analysis was indistinguishable when conducted on the weighted average Pearson *r*s.

and NVB using independent, objective methods. No systematic review was available for most of the behaviors, and when reviews existed, they were outdated, incomplete, ambiguous in their conclusions, and/or conflated findings for perceived and actual V–NVB relations.

Beliefs (perceived relations) about the relationship between V and NVB were clearly evident. Findings from known Pearson *r*s summarized in Tables 3 and 4 and mentioned in the text suggested that perceivers associated higher V with less smiling (but not when 11 studies using the same facial stimuli were treated as one study), more gazing, more lowered brows, a more expressive face, more nodding, less self touching, more touching of others, more hand/arm gestures, more bodily openness, less bodily relaxation, more bodily shifting, smaller interpersonal distances, more vocal variability, louder voice, more interruptions, shorter speech latencies/less pausing, fewer filled pauses, more laughter, fewer speech errors, faster speech (especially for U.S. perceivers), lower voice, and more relaxed voice (especially for U.S. perceivers). No beliefs, or only very weak beliefs, were evident for moving feet, facing orientation, conversational overlaps, and back-channel responses. The amount of available research for describing these overall trends varied widely from behavior to behavior. Regardless of whether there was a net trend, heterogeneity was the rule rather than the exception.

Many of the perceived V effects were robust in the sense that a large number of unretrieved null results would be required to negate the average trend. Many were also consistent with a study too recent to be included in the meta-analysis, in which respondents were asked directly to state their beliefs about the NVB of people high versus low in organizational rank as well as people high versus low in personality dominance (one of the very few studies to elicit stereotypes directly; Carney, Hall, & Smith LeBeau, 2005). Specifically, that study found that for both rank and personality dominance, the high-V person was expected to gaze more, touch self less, touch others more, use more hand and arm gestures, have less relaxed posture, use smaller interpersonal distances, face another person more directly, interrupt more, and have shorter pauses/speech latency (among other differences).

In contrast to the perceived effects, for many NVB, there was not much overall relation with actual V, based on known Pearson *r*s summarized in Tables 5 and 6 and mentioned in the text. There was no overall effect for most visible NVBs (smiling, gazing, raised brows, nodding, self touch, other touch, hand/arm gestures, postural relaxation, body/leg shifting, moving feet, and facing orientation). Some visible NVBs did show an association with V. More facial expressiveness, more bodily openness, and smaller interpersonal distances went with higher V. Clear-cut results emerged also for posed encoding skill (better expressors were higher in V). In terms of vocal NVBs, people higher in V spoke with less vocal variability, spoke more loudly, interrupted more (especially with successful interruptions), and had more relaxed-sounding voices. However, conversational overlaps, back-channel responses, filled pauses, pausing/latency to speak, laughter, speech errors, rate of speech, and vocal pitch showed no credible overall trends. The overall pattern tends to support previous suggestions that the voice conveys degrees of dominance better than the face (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979; Zuckerman, Amidon, Bishop, & Pomerantz, 1982). Again, the number of available studies varied widely from behavior to behavior. Regardless of whether there was an overall effect, the distributions of Pearson *r*s were almost always significantly heterogeneous.

We also conducted an analysis that assessed correspondence between perceived and actual V–NVB effects in terms of their correlation with each other, across behaviors (sensitivity correlation; Judd & Park, 1993). The obtained positive correlation between perceived and actual effects indicates accuracy in the sense that the pattern of effects across different NVBs was well predicted by the perceived effects. The sensitivity correlation addresses a different operational definition of accuracy from that suggested by a direct comparison of the magnitudes of perceived and actual effects (i.e., comparing them to see which is bigger). These two kinds of accuracy can vary freely from one another, and neither is, a priori, a better indicator than the other because different questions are asked in each (Hall, Stein, Roter, & Rieser, 1999; Judd & Park, 1993). If one takes the actual effects as the gold standard when making direct comparisons, then the perceived effects can be interpreted as inaccurate to the extent that they deviate in magnitude from the actual effects.

In the present study, the perceived effects were larger than the actual effects. When perceived and actual effects coincided in direction, the perceived effects were almost always stronger than the actual effects (e.g., loudness and interruptions), and for many other NVBs, a perceived effect existed in the absence of an overall actual effect (e.g., gazing and hand gestures). Our finding that perceived relations were stronger than actual relations is consistent with analogous comparisons for other variables in relation to NVB. People's beliefs about nonverbal cues associated with deception are more pronounced than the actual relations (Zuckerman & Driver, 1985), and the same is true for nonverbal cues in relation to personality (Gifford, 1994; Lippa, 1998).

Why Were Perceived V–NVB Effects Stronger Than Actual V–NVB Effects?

There are several possible reasons why beliefs about V and NVB may be stronger than the corresponding actual relations, only one of which assumes that the actual V effects are the gold standard against which beliefs are compared for accuracy. By this account, the beliefs represent stereotypes, and, therefore, they can reasonably be expected to be stronger than reality. Even when there is a "kernel" of truth to a stereotype, stereotypes are typically stronger and more pervasive than the kernel would justify (S. T. Fiske, 1998), presumably because the strength and consistency of a phenomenon are exaggerated in perceivers' minds, augmented by processes such as selective attention, selective exposure, and selective recall.

But methodological factors may also contribute to the stronger belief findings. V definition was typically not the same in the two types of studies. In all but a handful of the belief studies, perceivers were asked simply to make global ratings on adjectives suggestive of V (status, power, assertiveness, dominance, leadership, etc.) after viewing excerpts of behavior. The decontextualization entailed by such an approach may elicit more pronounced stereotypes or, at any rate, allows perceivers to supply their own V definition as well as their own imagination of what states (emotions, motives) may characterize V. Thus, the impression-formation approach may bring to mind particular definitions of V that do not correspond to those used in the studies of actual

V–NVB relations. Only rarely (e.g., Gifford, 1994) did an investigator collect both actual and belief findings using the same operational definition of V. This ecological disjunction can be overcome only if V definitions and contextual information correspond closely between actual and belief studies. To illustrate, studies in which actual V is defined as roles (i.e., physician–patient, manager–employee, teacher–learner, and the like) should be compared to perceived V studies in which perceivers are asked to guess whether the stimulus persons are physicians versus patients, managers versus employees, or teachers versus learners, respectively; or a study in which the criterion definition of actual V is self-reported personality dominance and the expressors are having a "get acquainted" conversation on video should be compared to a perceived V study in which perceivers are asked explicitly to guess the self-reported personality dominance of expressors having a "get acquainted" conversation on video.

Another methodological factor that could be implicated in the relative magnitudes of actual versus belief differences relates to restriction of range. In the typical belief study, perceivers making ratings of stimuli were free to spread out their ratings maximally across the scales provided (and, indeed, may have been urged to do so), creating more extremes on the V dimension than might have occurred in the studies of actual V. Furthermore, investigators conducting belief studies could often manipulate the NVB stimuli as dramatically and consistently as they wished, either by instructing actors or posers to display extremely varying cues or by selecting examples of cues to be judged that represented extreme low and high levels of behavior. For these reasons, it may be easier to produce large effects in a belief study than in an actual study because in the latter, the manipulations may not be very potent, actual V differences not very great, or variations in NVB not very extreme.

Still another methodological factor that could contribute to larger perceived than actual effects is methodological deficiency in the actual V–NVB studies. There are several reasons why the studies of actual V may not have captured true behavioral differences between higher and lower V people. Many of the studies manipulated V in laboratory-based interactions. Such studies often involve some degree of role playing, including the dangers inherent to that methodology. It is not clear, however, whether role playing would exaggerate V effects (if participants are drawing on their V stereotypes) or would minimize them (if participants are trying to counter the stereotypes, or if they wish to protest their role assignments, or if the V manipulation is simply weak). On the latter point, the common practice of assigning equals to different V roles in the laboratory may be intrinsically unconvincing and unmotivating to participants. Even a manipulation check that shows significant self-reported differences in felt V does not guarantee that the manipulation goes more than skin deep or that participants' responses to the manipulation check are not biased by social desirability concerns. Even when the experimental comparison is not between equals who are assigned to V roles but rather between people intrinsically unequal in V (e.g., people of unequal rank in an organization), the interaction is typically fleeting, there is little at stake, and their relationship and/or activity are likely to be artificial in some way (e.g., having a conversation in front of a video camera). Thus, participants may not experience or express their V roles as they would in real life. Therefore, the existing literature on what we call "actual" V–NVB relations may underestimate the true actual relations.

Yet another methodological factor that could contribute to larger perceived than actual effects is the possible impact of multiple cues on perceptions of V. This applies to studies in which perceivers were exposed to stimuli containing many simultaneously occurring cues, as in Gifford's (1994) study, in which perceivers watched videotapes of people interacting. In such a study, the overall impression of V may have been based on an integrated appraisal of several (correlated) NVBs rather than on the single NVB for which a given perceived V–NVB correlation was calculated (see Footnote 2). Therefore, the perceived V–NVB correlation may be misleadingly large to the extent that it is based on more than the single NVB of interest. Indeed, studies that specifically related perceived V to a composite of behaviors showed particularly large effects (Argyle, Salter, Nicholson, Williams, & Burgess, 1970; Burgoon, Newton, Walther, & Baesler, 1989; Hart & Morry, 1997; Henley & Harmon, 1985). (These studies were excluded from the meta-analysis because they did not isolate specific NVBs; see discussion of limitations, below.)[12]

And yet another methodological reason why perceived effects may have been larger than actual effects is psychometric. It is likely that the typical belief study, in which a standard set of stimuli is shown to many perceivers whose responses are averaged before the V–NVB correlations are calculated, controls random error better than does the typical study of actual V. Less random error would produce larger effect sizes in belief studies.

A final possible explanation for weaker actual V–NVB effects stems from the arguments made earlier in this article about the impact of proximal states on NVB. Within a given study, participants who are ostensibly equivalent in V may experience proximal states (emotions, motives, role construals) that are highly variable. For example, one person assigned to be "boss" might construe that role in an authoritarian or punitive way, whereas another person assigned to be "boss" in the same study might construe it in a facilitative or supportive way. Or one person occupying the "low" role, whatever it may be in the given setting, may feel hostile, another may feel anxious, another may seek to win approval, and so forth. To the extent that these different construals of the same ostensible role produce different behaviors, an overall effect of V becomes increasingly unlikely. Or, those with a sociably dominant personality might gaze a lot, but those with an aggressively dominant personality might not (see Kalma et al., 1993). Such proximal influences would attenuate an overall actual V–NVB effect.

In summary, it is not possible to state with certainty why the belief studies produced more, and stronger, effects than the actual studies.

[12] One might, therefore, predict that perceived V–NVB relations would be stronger when perceivers were exposed to more cues at once (as in excerpts of videotape with sound; e.g., Gifford, 1994) than when exposed to only one varying cue (as in photos that vary specific cues such as brow position while holding other cues constant; e.g., Keating et al., 1981). However, because in the latter sort of study investigators can manipulate cues dramatically, the effects should be large there, too.

Why So Much Heterogeneity?

For both actual and belief studies, the variation in effect sizes was great, with the distribution often including a substantial number of significant positive and negative correlations between V and a given NVB. Upon inspecting the features of studies in an effort to understand the pronounced heterogeneity, a number of moderators did emerge, depending on the particular NVB. These included the definition of V, culture, type of task, and strength of experimental manipulation, among others. One apparent moderator was the methodology for eliciting people's beliefs. Notably, the "coat-rack" paradigm (enacting behavior toward an imagined person standing near a coat rack; Mehrabian, 1968; Mehrabian & Friar, 1969) sometimes produced results very different from other methododologies. This is interesting because the above two Mehrabian studies have often been cited as establishing the nature of nonverbal communication between unequal-status persons.

Although a number of moderator effects were identified, the great variability across studies remained mostly unaccounted for. Finding a large amount of variability in effect sizes is consistent with our arguments made above concerning the likely impact of proximal states on V–NVB relations. Whereas within-study variation in proximal states would help to wash out an overall effect within a given study (as suggested above), between-studies variation in proximal states would produce strongly contrasting results across studies. We suggested such an interpretation at several points in the presentation of results. As another illustration of this point, if the operational definition of V or the research context encouraged ingratiation among people low in V, then one would expect to see them smile an enhanced amount, because smiling and ingratiation are related (Lefebvre, 1973; Rosenfeld, 1966a, 1966b). This possibility exists in the study by Deutsch (1990), which was the sole study to show a large negative relation between actual V and smiling. In that study, subordinates (but not superiors) were instructed to try to make a favorable impression. The point is not that there is something wrong with such a study, but rather that instead of representing the "general case" of low V, it represents a particular motive on the part of those having low V. If another study instructed subordinates to try to impress superiors with how smart they are (for example), then we might see different results.

Construct Validity of V

Concern with construct validity is a concern over the meanings of variables. In arguing that V maps very imperfectly onto psychological states, we are suggesting there is a weakness in the construct validity of V. In contrast to theories that ascribe rather sweeping states and motives to high- and low-V persons (e.g., Keltner et al., 2003), we believe that V can take so many forms—not only in its formal definition as in teacher–student, boss–subordinate, dominant–submissive personality, and so forth, but also in the wide range of psychological states (goals, motives, emotions, role construals) that can be experienced by a person no matter where on the V continuum she or he may stand—that its value as a meaningfully predictive construct is open to question. We would predict that when main effect predictions for V are confirmed in behavior, they are likely to be for behaviors that are close to the core definition of V and are, therefore, tautological (or should be seen as validation of the measurement or manipulation of V). Examples of such tautological predictions would be that high-ranking persons are more likely to exert authority and control or are more likely to receive the privileges of high rank. However, when predictions are made for nontautological relations—relations that are not true by definition, which we believe is the case for NVB—then main effect predictions for V are likely to be far less successful.

Because the V dimension, being structural in nature, does not map onto any particular emotional states and social motives (i.e., proximal states), whereas NVB is closely connected to such proximal states, it is not a big leap to suggest that NVB may be determined by proximal states that are confounded with V rather than intrinsic to it. The confounding of V with proximal states in research presents a grave challenge to our understanding of the relation of V to NVB. At the very least, it is incumbent on researchers to attempt to assess whether V has explanatory power if states are controlled. As long as researchers ignore this problem, they may continue producing extremely inconsistent, or null, results for NVB (depending on whether the proximal states variance has its greatest effect between or within studies).

An additional concern, also related to issues of confounding and construct validity, is that the "V"-ness of a given operational definition of V may be highly variable. That is to say, V may sometimes be the predominant, or at least a very salient, dimension of relationship (the example of master and slave comes to mind), but sometimes there may be multiple dimensions or functions to a relationship of which V may be only one, and perhaps not the most important one in producing behavioral effects. A good example is the teacher–student relationship. Though teacher versus student is typically construed in this literature as a V difference (e.g., Leffler et al., 1982), much of what teachers and students do may be related to their functional roles, not to their discrepant V. Teachers' tendency to talk a lot, for example, may stem more from their role functions than from their higher V. Researchers should be encouraged to engage in an appropriately nuanced conceptual analysis of their chosen operational definitions of V.

Construct Validity of NVB

Authors have long recognized that NVB does not have dictionary-like meanings, but rather the meaning of a given NVB depends heavily on contextual factors such as concurrent verbal behavior, other NVBs, intentions, antecedent events, and the situational and interpersonal context (Berger, 1994; Burgoon, Buller, & Woodall, 1996; Knapp & Hall, 2005; Richmond & McCroskey, 2000) as well as the specific morphology of the NVB (e.g., for smiling, Ekman et al., 1990; for interpersonal touch, Hall, 1996). Thus, we might measure with great precision a person's degree of postural lean, frequency of hand gestures, or vocal fundamental frequency, but we may not know what those cues signify; or, we might lump into the general categories of smile or touch different kinds of smiles and touches that have very different meanings. A more fine-grained NVB measurement system, that could distinguish between different possible meanings or functions, would help us to understand discrepant associations to V; however, such a system is not yet in existence and would be difficult to develop because the different meanings and functions may not be detectable in the morphology of the behavior alone but only in relation to contextual factors and inner states that are hard to measure.

Ambiguity over the meaning of NVB raises the additional danger that one will opportunistically attribute meaning to a given NVB on the basis of how it relates to V rather than on the basis of independent criteria. As a hypothetical example, consider conversational overlaps, a behavior with ambiguous meaning and function. If lower V people do this behavior more, then one might conclude that the overlaps mean overeagerness on the part of the lower V person. However, if higher V people do this behavior more, then one might conclude that the overlaps mean a domineering conversational style. This example not only demonstrates the danger of making a post hoc interpretation but also suggests an additional danger, that of making an interpretation that conveniently fits one's preferred theory of how low- and high-V people behave. If high-V people commit more overlaps and one thinks that high-V people are domineering, then one might favor the "overlaps mean domineering" interpretation. However, if high-V people commit more overlaps and one thinks that high-V people would be eager to convey information (e.g., if they were teachers), then one might prefer the "overlaps mean eagerness to speak" interpretation.

Thus, the problem of indeterminate meanings and functions of NVB could not only contribute to the heterogeneity of effects but also could exacerbate the difficulty of interpreting overall findings and invite biased interpretation. These problems are not easily solved.

Do V–NVB Relations Parallel Gender Differences in NVB?

We began this article with Henley's (1977) proposed parallelism between V and gender effects for NVB. Some NVBs associated with higher actual V in our review do tend to be associated more with men (more bodily openness, louder voice, more interruptions, and less vocal variability; Hall, 1984, in press). Also, the visual dominance ratio, when measured in mixed-gender dyads, differs between men and women in parallel fashion to how it differs when interactants differ in V (Dovidio, Ellyson, et al., 1988). Of course, finding the predicted parallelism between V and gender effects does not mean that the one explains the other; it only means that a causal connection may exist. Moreover, several NVBs associated with higher actual V are more likely to be shown by women (more facial expressiveness, smaller distances, and better encoding skill; Hall, 1984, 2005). Also, nonverbal decoding skill is higher in high-V people and women (Hall, 1984, in press; Hall et al., 1997). Finally, quite a few NVBs that showed no overall actual V effects do show gender effects (e.g., smiling, gazing, nodding, self-touching, touching others, gesturing, bodily relaxation, shifting body and feet, direct orientation, speech errors, back-channel responses, filled pauses, and pitch; Hall, 1984, in press; LaFrance et al., 2003).

That the overall trend is against parallellism is consistent with a lack of parallelism found in two studies that measured V effects and gender effects within the same participants—employees in a company (Hall & Friedman, 1999) and employees in a university (Hall, Smith LeBeau, Gordon Reinoso, & Thayer, 2001). In both studies, there were both V and gender effects, but in both studies, the behaviors that showed V effects were not the same behaviors that showed gender effects or else they showed nonparallel gender effects. In summary, there is only limited parallelism between V and gender in their respective relations to NVB.

Henley's (1977) theory that V underlies nonverbal gender differences, sometimes called the oppression or subordination hypothesis, rests on the existence of pervasive gender/V–NVB, parallels. The present review challenges Henley's theory. For those NVBs that do show parallel V and gender effects, researchers should conduct studies with the goal of going beyond simple parallelism to determine a possible causal role for V in explaining the gender differences. Moreover, because part of the appeal of the oppression hypothesis was its ability to accommodate many gender differences parsimoniously under the V concept, any future theorizing would need to explain why V might account for some gender differences in NVB and not in others.

It is interesting that not even the perceived V–NVB relations showed pronounced parallelism as one might expect according to Henley's (1977) theory. Numerous behaviors that perceivers associated with higher V have been shown to be displayed more by women than by men (more gazing, more expressive face, more nodding, more touching others, more gesturing, less bodily relaxation, smaller interpersonal distances, more vocal variation, fewer filled pauses, more laughter, and fewer speech errors). Even smiling, one of the behaviors highlighted by Henley (1977) in her exposition of the oppression hypothesis, showed an overall negative perceived correlation only when many perceiver groups who rated the same stimulus set were included as separate studies. When these were combined and entered as one study, there was no overall belief that higher V goes with less smiling (though the distribution was highly heterogeneous). A correlation between imagined V and imagined smiling also was not found in the recent beliefs study by Carney et al. (2005), described earlier.

It is possible that we have been overinclusive in considering all possible NVBs as candidates for showing the kind of parallel effects that are central to Henley's (1977) theorizing. Certainly, there are NVBs in the present review that Henley did not mention in her book, nor in her subsequent writings, and that either she or an adherent of the oppression hypothesis may argue are irrelevant to the theory. It is hoped that the catalogue of findings contained in the present article will be useful for those who would like to further develop and refine the oppression hypothesis. In our opinion, actual associations of V to NVB are not frequent enough, nor parallel enough with gender differences in NVB, generally to support the theory. However, there is much work remaining in order to understand whether there are specific circumstances or behaviors for which differences in V can successfully explain gender differences in NVB.

Limitations and Conclusions

The present review has many limitations, some of which we have alluded to. The number of studies available for a given category of NVB was sometimes very small. And, because of the many possible definitions of V, the number of studies in which common definitions of both V and NVB were used was very limited indeed, which severely handicapped our ability to detect moderators of the many heterogeneous effects that were uncovered.

Just as problems could arise by grouping together conceptually different V definitions under the V heading, similarly, by grouping

different NVBs together, we may have obscured important differences. Ideally, we would have separately analyzed the similar, but still subtly different, NVBs that we grouped together. For example, number of glances, average duration of glances, and total duration of gaze are not entirely synonymous and may have different relations to V. Similarly, the distinction between staring (Dovidio & Ellyson, 1985; Edinger & Patterson, 1983) and high levels of normal conversational gazing is important but was not made in the studies at our disposal. And, as discussed above, ambiguities that are inherent to the interpretation of NVB make it difficult to know what the findings mean even when the findings are clear.

Another limitation is that, although we reviewed many categories of NVB, there were still many behaviors that were studied too infrequently to be included in quantitative summaries. Nevertheless, some of these behaviors showed notable effects that should not sink into oblivion simply because they were not included in the present review. For example, in studies of actual V, Kalma (1992) found that the leader in a group engaged in prolonged looking at the next person to take the floor, as though choosing the next person to speak; Hsee, Hatfield, and Carlson (1990) found that higher status participants displayed more emotional contagion on their faces than did lower status participants; and Gifford (1994) found that people higher in personality dominance engaged in less object manipulation. In studies of beliefs, Schwartz, Tesser, and Powell (1982) found that standing above or in front of someone was perceived as relatively high in dominance, and Lincoln (1984) found that hands on hips was perceived as relatively high in potency.

Furthermore, our treatment of individual NVBs precluded inclusion of composites that grouped several NVBs together (these were excluded because no two studies used the same composites). However, in real communication situations, cues typically do not occur in isolation from each other, and examining them separately may underestimate their effects, as pointed out by Aries, Gold, and Weigel (1983) and Berger (1994). As examples, a rather strong effect was found for an "immediacy" composite, consisting of eye contact, body relaxation, direct orientation, smiling, vocal expressiveness, close physical distance, and hand gesturing, in relation to self-rated assertiveness (Prisbell, 1985), and for a "dominant cue" composite, consisting of touching, pointing, invading space, and standing over another person, in relation to impressions of dominance (Henley & Harmon, 1985). Aries et al. (1983) demonstrated empirically that actual personality dominance predicted a composite of behaviors much better than it predicted individual behaviors. Thus, because infrequently studied NVBs and NVB composites are not included in the present meta-analysis, the conclusions we reach about V–NVB relations may underrepresent the true strength of the phenomena.

It is important that readers not conclude that the lack of overall actual V effects for many NVBs means that V was not related to these behaviors. The existence of significant variability means that V was often related to NVB but to different degrees and even in contradictory directions. This suggests that it may not be meaningful from this point on to seek out the overall or general trend (Hall, Horgan, & Carter, 2002). Because there is no general affective or motivational state that can describe everyone with low V or high V, it follows that the search for a general V–NVB relation is misguided or at best should be seen as a starting point for a more theoretically refined investigation (Schmid Mast & Hall, 2004a). Future research needs to systematically measure (or experimentally vary) not only V but also different proximal variables (emotions, motives, role construals, etc.) that may vary freely from V in a conceptual sense but that may be confounded with it in a particular instance.

But despite the limitations and ambiguities that we have discussed at length, the present review serves the purpose of comprehensively cataloguing V–NVB effects and drawing the distinction between actual and perceived connections between these two constructs, a difference that is often blurred when authors make summary statements about V and NVB. It is important to recognize that understanding the extent to which different NVBs suggest V to perceivers is not a substitute for understanding the behavior of people with different levels of actual V. The review may thus help to separate fact from stereotype.

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Received May 12, 2004
Revision received March 8, 2005
Accepted April 26, 2005 ■

United States Postal Service

Statement of Ownership, Management, and Circulation

1. Publication Title	2. Publication Number	3. Filing Date
Psychological Bulletin	0 3 1 – 1 4 0	October 2005
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
Bimonthly	6	Mbr $87 Indiv $180 Inst $465

7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4): 750 First Street, N.E., Washington, D.C. 20002-4242 — Contact Person: Barbara Spruill; Telephone: 202 336-5578

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer): 750 First Street, N.E., Washington, D.C. 20002-4242

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)

Publisher (Name and complete mailing address)
American Psychological Association
750 First Street, N.E.
Washington,D.C. 20002-4242

Editor (Name and complete mailing address)
Harris M. Cooper, PhD
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213 West, Duke Building, Durham, N.C. 27708

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13. Publication Title: Psychological Bulletin	14. Issue Date for Circulation Data Below: July 2005	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	5400	4800
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d. Free Distribution by Mail (Samples, complement ary, and other free) (1) Outside-County as Stated on Form 3541	247	235
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f. Total Free Distribution (Sum of 15d. and 15e.)	247	235
g. Total Distribution (Sum of 15c. and 15f)	4307	3986
h. Copies not Distributed	1093	814
i. Total (Sum of 15g. and h.)	5400	4800
j. Percent Paid and/or Requested Circulation (15c. divided by 15g. times 100)	94.2	94.1

16. Publication of Statement of Ownership
☐ Publication required. Will be printed in the November 2005 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Alan K. Meginnis Sr. Director Publishing Services — Date: 10/10/05

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