Task Performance and Perceptions of Anxiety: Averaging and Summation in an Evaluative Setting

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Suggests that individuals’ “stage fright,” or perceptions of anxiety and performance, is a function of tendencies to both average and summate the impact of audience members. We found that under certain conditions adding an evaluative member to an audience decreased anxiety, whereas in other conditions the addition of evaluative members increased anxiety. These results are not expected from social impact theory or social facilitation research and suggest that individuals do not react to groups of individuals in a manner analogous to the way in which trait information is typically averaged in forming impressions of individuals (Anderson, 1981). An averaging-summation model that does account for these findings is presented. This research has implications for research on crowding, stress, social influence, and affective responses.

The question of how audience presence affects a performer (i.e., social facilitation) has been extensively researched since Triplett’s (1898) seminal work. Controversies have centered around such issues as whether audience presence increases or decreases performance levels, the sufficiency of conspecific presence for social facilitation, and the role of cueing positive and negative consequences in mediating social facilitation (e.g., Cottrell, 1968; Geen, 1979; Paulus, 1983; Paulus & Murdoch, 1971; J. J. Seta & Seta, 1983; Weiss & Miller, 1971; Zajonc, 1971). A central concept that emerged from this literature is that audience presence induces anxiety, drive, or arousal, which then mediates individuals’ performance levels. Interestingly, very little attention has been directed to the study of how various types of audience arrangements are perceived by performers. Most studies within this area use manipulations of homogeneous audience arrangements (e.g., audiences composed of members of similar status or expertise). Yet most real world audience settings are composed of members with various ages, status levels, and expertise (i.e., heterogeneous audiences). Most theories within this area assume that it is the perception of standards (e.g., Carver & Scheier, 1981; J. J. Seta & Hassan, 1980), consequences, or evaluation (e.g., Cottrell, 1968; Schlenker & Leary, 1982; Weiss & Miller, 1971) that effectively generates arousal, anxiety, or motivation within audience settings. These factors should be affected by the composition of audience arrangements.

The purpose of this article is to explore several perspectives that make predictions about individuals’ perceptions of various types of audiences. A key issue is whether the perception of source of evaluation is analogous to impression formation.

Social Facilitation

Audience researchers have commonly assumed that in an evaluative context, the addition of an audience member would either increase or have a minimal effect on anxiety (e.g., Cottrell, 1968; Geen, 1979; Paulus & Murdoch, 1971; J. J. Seta & Seta, 1983; Weiss & Miller, 1971). For example, Weiss and Miller (1971) considered an audience member a source of arousal induction only if he or she cued negative expectancies. If a performer expected to receive a positive outcome from an audience member, the spectator would not generate arousal. Extrapolating from this view, the addition of some audience members would serve to increase perceived anxiety (when they cue negative outcomes), whereas adding other types of audience members would have no effect on perceived anxiety (when they cue positive outcomes or are minimally negative).

This view can be used to predict individuals’ perceptions of heterogeneous audience arrangements if one assumes that the amount of anxiety generated by an audience depends on the severity as well as the likelihood of receiving a negative outcome (cf. Paulus, 1983; J. J. Seta & Hassan, 1980; J. J. Seta & Seta, 1983). Therefore, a performer can expect a generally positive outcome but may still be somewhat anxious in an evaluative setting because success is not certain. In general, then, more arousal, anxiety, or both would be generated by an audience member who can potentially administer severe rather than minimal consequences, and more anxiety would be produced when the consequences to the performer are likely to be negative rather than positive. Furthermore, the anxiety of a performer would be expected to be greater when in the presence of both a high and low status member than when in the presence of just the high status or just the low status member. The addition of...
any status member to an audience would result in an increase in the overall felt anxiety.

Social Impact: Psychophysical Model

Latané's (1981) social impact model directly addresses the effects of homogeneous evaluative audience arrangements. It does not, however, directly address heterogeneous audience effects. Nevertheless, because this model is based on psychophysical assumptions, one could assume that the effects of varying evaluative audience members would be analogous to luminance perception (cf. Latané, 1981, p. 344; Latané & Harkins, 1976). In luminance perception, the intensity of two 100-watt light bulbs plus two 50-watt light bulbs will be greater than that of only two 100-watt light bulbs. If this psychophysical model is appropriate for the perception of heterogeneous audiences, then the impact of a mixed group of two high and two low status audience members should be greater than that produced by only two high status members.

Impression Formation Approach: Weighted Averaging

A different perspective of audience perception would be obtained by incorporating the theory and research within the impression formation literature (e.g., Anderson, 1981). From this work one might infer that audience perception is analogous to forming an impression of an individual. The two settings share some similarities. In the impression formation situation each bit of information (e.g., trait) contributes to the impression of a particular person. In the audience setting, each person contributes to the impression of a group (e.g., an audience). Consequently, performers (and possibly audience members themselves) in an evaluative setting may average the influence of each audience member in a manner similar to the way people average trait information concerning a single individual (J. J. Seta, Wang, Crisson, & Seta, in press).

Anderson's (1965, 1974, 1981) weighted averaging formulation makes predictions about impressions formed from traits having similar or discrepant scale values. For example, two very positive traits and five moderately positive traits produce a more positive impression than just two very positive traits when the moderately positive traits have a scale value above that of the weighted average of the initial impression and the very positive traits. However, if two minimally positive traits with scale values below the weighted average of the initial impression and the other positive trait are added to this configuration, the positivity of the overall impression would be reduced. The addition of these minimally positive traits lessens the impact of the more favorable traits. Therefore, from Anderson's model, the addition of two minimally positive traits to two very positive traits will produce an impression that is less favorable than when there is only information about two very positive traits.

Similar predictions can be made if this model is applied to the perception of evaluative audience contexts. In an audience setting, the typical impact or concern level experienced by the perceiver would correspond to a perceiver's initial impression. The typical or initial impact can be conceptualized as that level of concern that most typifies the individual's likely state of anxiety. For most individuals this corresponds to their anxiety level in the absence of an audience or other evaluative stressors.

The impact associated with any individual audience member can be conceptualized as a function of each audience member's ability to communicate and administer consequences to the performer. High expert members would be more likely to detect errors, and their standards would be higher than those of low expert members. Therefore, high expert audience members are associated with a scale value or concern level above that of low expert members.

If the evaluative setting is analogous to the impression formation context described in the preceding paragraph, more anxiety should be produced by an audience of two high experts and two moderate experts (e.g., two faculty and two graduate students) than by an audience of two experts, as long as the moderate experts' (e.g., graduate students) scale value is above that of the weighted average of the initial concern level and that of the high expert members. If, however, low status (e.g., high school students) audience members are added to an audience of high experts, a reduction in felt anxiety would occur. The low experts would have a scale value below that of the weighted average of the initial concern level and that of the high expert faculty. These predictions are based on the assumption that the concern levels associated with audience members are averaged with the subject's typical concern level. Therefore, from a weighted average formulation, an audience of two faculty and two graduate students should generate more anxiety than an audience of two faculty. However, an audience of two faculty and two high school students should be less anxiety provoking than an audience of two faculty alone. This view would also make predictions about homogeneous audiences. For example, the addition of two faculty to an audience of two faculty or of two high school students to an audience of two high school students will increase anxiety as long as the concern levels associated with the added audience members are above the weighted average of the subjects' initial concern level and that of the first 2 audience members. This approach, then, makes predictions about homogeneous as well as heterogeneous evaluative sources of evaluation.

There are a number of other interesting implications that follow from this analysis. For example, the addition of low status members (e.g., third-year high school students) to an audience of high status members (faculty) can decrease anxiety, whereas the addition of the same low status members to an audience of moderate status members (undergraduates) can raise anxiety. The addition of low status members to an audience of high status members would be expected to lower the combined average of the low status members, the high status members, and the subject's initial concern level. For example, assume that the scale value of a high status member is 8, that of a low status member is 2.5, and that the subject's initial concern level is .5. When a low status member is added, the average consists of the scale value of the low status member (2.5), the high status member (8) and the subject's initial concern level (.5). The average, then, would be 3.66 ((8 + 2.5 + .5)/3) and is lower than that associated with just that of the high status member ((8 + .5)/2 = 4.25). However, when these same low status members (e.g., third-year high school students) are added to an audience of undergraduates that do not significantly differ in status from
the low status members, the addition of these members would not lower the *combined* average of the low status members, the undergraduates, and the subject's initial concern level to the same degree as it would if the existing members were high in status. In fact, their inclusion can raise anxiety. For example, assume that the scale value of a moderate status member is 3, that of the low status member is 2.5, and the subject's initial concern level is .5. When a low status member is added, the average consists of the scale value of the low status member (2.5), the scale value of the undergraduate (3), and the subject's initial concern level (.5). The average, then, would be 2 \((2.5 + 3 + .5)/3\) and is higher than that associated with just that of the undergraduate audience member \((3 + 2.5)/2 = 1.75\).

Therefore, when the new audience members are above the subject’s initial concern level but significantly lower than the existing members, the addition of these members is expected to lower anxiety. However, when the new members are above the subject’s initial concern level but are not significantly different from that of the existing members, their addition would not lower anxiety as much as it would if the existing members were high in status. In fact, as pointed out in the example, their inclusion can raise anxiety. We designed Experiment 1 to test these predictions.

**Averaging and Summative Process Analysis**

Most audiences in naturalistic settings represent complex evaluative contexts. A strong possibility that has not been considered is that individuals are sensitive to the multidimensional nature of these settings. The characteristics of each member (e.g., expertise, status level, or disposition) may contribute to the performer's general impression of the audience. A general impression of the audience would allow the performer to anticipate probable standards of performance and to assess his or her likelihood of meeting these standards. At the same time, each audience member's presence raises the total consequences that may accrue to the performer. The performance may bring a more intense negative or positive reaction from a large rather than a small group of observers. Increasing the number of observers at any level of expertise also increases the probability that errors in performance will be detected. Thus, an individual should also be sensitive to the summative impact of audience members.

In this section, we present a general analysis that attempts to model individuals' reactions to consequences from various sources (e.g., audiences, crowds, stress, and social influence). This model differs from the previously discussed viewpoints in that it suggests that a single method of integrating life events (e.g., weighted averaging or summative rules) will not accurately describe individuals' reactions. This model assumes that individuals are engaged in simultaneous processes that sensitize them to the central tendencies and summative impact of the components of important life events. This is but one of several possible models that might be used to describe averaging and summative tendencies. It is offered as a first approximation in an attempt to understand how individuals assess and react to complex stressful and evaluative settings. The particular features of the model are of less importance than its general property of combining averaging and summative tendencies.

This model is expressed as

\[
V = \frac{W_0S_0 + W_1S_1 + W_2S_2 + \ldots}{W_0 + W_1 + W_2 + \ldots}
\]

\[
R = \frac{V_1[S_1 + W_2S_2 + \ldots]}{V_1 + V_2}.
\]

The first bracketed section contains an averaging rule, the second a summation rule. \(R\) refers to the individual's overall response to the various components of the context; \(S\) refers to scale values of the components \((S_0 \text{ represents the initial state of the individual and } S_1, S_2, \ldots \text{ refers to the scale values of the individual sources of information})\); \(W\) refers to the weight or the importance of the stimulus; and \(V\) refers to the strength of these two integration rules. \(V_1\) corresponds to the strength of averaging and \(V_2\) to the strength of summation.

Essentially, this formula expresses a method of integrating various components of a setting that includes individuals' sensitivities to both the average impact of the various sources of consequences (first bracketed section) and the summative impact of every source of consequences (second bracketed section). Each stimulus within the context \(S\) contributes to the determination of the average and summative impact of the components and combines to produce an overall response to the setting \((R)\). Following Anderson (1981), each stimulus has a value along some dimension of judgment. These values may be along dimensions such as valence, stress value, informational value, associative status, and expertise. In addition, each stimulus is weighted by its relative salience or importance in the judgmental context (Anderson, 1981). The summation rule is raised to a power \((t)\) with an exponent less than 1 to reflect the marginally decreasing utility function for redundant features of a setting that is found in most perceptual phenomena (e.g., Latané, 1981). For example, the difference between the 100th and 99th person is less than the difference between the 1st and 2nd person. (See the General Discussion for how one can also use social impact [Latané, 1981] to account for the summative aspect of the averaging-summation analysis.)

The averaging and summative tendencies may also vary in terms of their relative strength \((V)\) in determining an individual's response. This strength factor should be influenced by such factors as the capacity demands of these processes and the amount of capacity available to individuals in the setting. In addition, the nature of the response per se may alter the relevance of averaged or summed information and may therefore alter the strength value. For example, if an individual is asked about his or her impression of another individual or the status level of a group, averaging tendencies may be stronger than summative processes \((V_1 > V_2)\). An individual's response would then reflect stronger averaging tendencies than summative tendencies. Similarly, if one is asked about the distracting aspects of an audience or about the affective reaction to a particular encounter, for example, summative tendencies might be stronger than averaging processes. Thus, the question an individual is asked may determine the relative strength of the aver-

\[1\ One should note that it is not necessary to attach the same weights to a stimulus in both the averaging and summation portions of the model.
aging and summative contexts. In most affectively laden contexts, however, individuals are most likely sensitive to both the average and cumulative effect of stimuli.

This model should be especially applicable to audience settings. Consider an individual who is anticipating performing in front of an audience. Given the paramount importance that most people place on this kind of event (e.g., the individual will likely draw on all the information he or she has available in order to anticipate the probable outcomes of this encounter), two kinds of information about the composition of the audience would be especially useful for anticipating the type of outcomes they will be experiencing. One type of information is central tendencies. The type of members that make up this audience or the individual characteristics of audience members would provide the performer with information necessary to form an impression of the audience as a group and anticipate probable reactions. Information such as the status level, expertise, disposition, and affiliations of the audience members would aid in this determination. Audience members' scale values along these dimensions may be averaged (in the manner described earlier) to determine the central tendency of audience as a whole. In addition to the group's central tendency, each member of an audience is also a distinct source of consequences. Each audience member's presence raises the total consequences that may accrue to the performer. Increasing the number of observers (at any level of expertise) also increases the probability that errors in performance will be detected. In a sense, there is threat in numbers as well as power in numbers. Thus, an individual should also be sensitive to the summative impact of audience members.

According to our model, perceptions of anxiety generated by audience arrangements should reflect both averaging and summative tendencies. Experiment 1 explores whether averaging does occur in heterogeneous audience settings, as this phenomenon has not been widely investigated (see J. J. Seta et al., in press, for exception). Experiment 2 investigates the feasibility of considering averaging and summative tendencies to be a part of individual's reactions to heterogeneous audience arrangements. Experiment 3 investigates whether these reactions transfer to actual performance in heterogeneous audience settings.

**Experiment 1**

**Method**

**Subjects.** Ninety-eight female students from introductory classes at the University of North Carolina at Greensboro took part in the experiment.

**Design and procedure.** The design included one between variable (in which high status was a faculty member in one condition and an undergraduate in the moderate status condition) and two within variables (audience composition [homogeneous + mixed] and audience size). All subjects were exposed to different audience sizes and different audience compositions: all relatively high (homogeneous high), all relatively low (homogeneous low), and audiences of both high and low status members (mixed) (see Table 1). Prior work (J. J. Seta et al., in press) has indicated that the audience members chosen are anxiety provoking: In audience arrangements consisting of just high or just low status members, increases in audience size increased anxiety. That audience size increased anxiety would indicate that the scale value of each of these members is above the subjects' initial concern level.

**Table 1**

<table>
<thead>
<tr>
<th>Experiment 1 Design</th>
<th>Audience size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status</strong></td>
<td><strong>Low</strong></td>
</tr>
<tr>
<td>Homogeneous high</td>
<td>2 faculty</td>
</tr>
<tr>
<td>Mixed status</td>
<td>2 faculty &amp; 2 high school students</td>
</tr>
<tr>
<td>Homogeneous low</td>
<td>2 high school students</td>
</tr>
<tr>
<td>Moderate (between variable)</td>
<td></td>
</tr>
<tr>
<td>Homogeneous high</td>
<td>2 undergraduates</td>
</tr>
<tr>
<td>Mixed status</td>
<td>2 undergraduates &amp; 2 high school students</td>
</tr>
<tr>
<td>Homogeneous low</td>
<td>2 high school students</td>
</tr>
</tbody>
</table>

One half of all subjects were exposed to audiences in which the members were undergraduates (moderate status between condition), whereas the other half were exposed to audiences in which the relatively high status members were faculty (high status between condition). As can be seen from Table 1, subjects within each of these conditions were exposed to six within-subjects conditions. In the high status between condition, subjects were exposed to the following six audiences: 2 faculty, 4 faculty, 2 third-year high school students, 4 third-year high school students, 2 faculty plus 2 third-year high school students, and 2 faculty plus 4 third-year high school students. In the moderate status between-subjects condition, subjects were exposed to the following six audiences: 2 undergraduates, 4 undergraduates, 2 third-year high school students, 4 third-year high school students, 2 undergraduates plus 2 third-year high school students, and 2 undergraduates plus 4 third-year high school students.

Subjects participated in groups (approximately 50 students per group). They were given written instructions in which they were told to think about how anxious they would be while reading to an audience a paper they wrote concerning their major area of study. They were to indicate their felt anxiety by writing down a number between 0-100 (where 0 corresponds to a very low felt anxiety, 50 to a moderate level, and 100 to a very high level). They were not explicitly told how many audience members (e.g., how many faculty, undergraduates, or high school students) were in the audience. Rather, they were given the names (first and last) of the faculty, undergraduates, or high school students that comprised the various audience arrangements. For example, under the heading of faculty two or four names would appear. Typical American names were used, and no name (combined first and last) was used more than once. The orders of name presentation were counterbalanced following the format described by Sloan and Ostrom (1974). The ordering of the six conditions was counterbalanced via a Latin square.

**Results and Discussion**

The means of the verbal anxiety score for each of the 12 conditions are contained in Table 2. The analysis of variance (ANOVA) revealed a significant audience size main effect,  \( F(1, 96) = 32.84, p < .01 \); a significant audience composition effect,  \( F(2, 194) = 92.56, p < .01 \); and a significant status effect,  \( F(1, 96) = 9.88, p < .01 \). These effects indicate that subjects' verbal anxiety was affected by the size of the audience and the composition of the audience.

Because the manipulation of size and status in group composition is not purely orthogonal, we performed an additional analysis. We first...
These interactions are due in part to the finding that the anxiety scores of the mixed condition of two undergraduates and four high school students were higher when viewing large rather than small audiences and when viewing high status rather than low status audiences. The main effect of audience size may reflect the summative impact of adding audience members. From a weighted averaging perspective, the main effect for audience size suggests that the concern level associated with the low and high status members was above the subject's initial concern level. The addition of new members to an existing audience would only increase anxiety if the scale value of these members was above the subject's initial concern level.

In addition, we obtained three significant interactions; a Status (the between-subjects variable) × Audience Composition interaction, $F(2, 192) = 38.08, p < .01$; a Status × Audience Size interaction, $F(1, 96) = 7.52, p < .01$; and a Status × Audience Size × Audience Composition interaction, $F(2, 192) = 3.18, p < .05$. These interactions are due in part to the finding that the anxiety scores of the mixed conditions of two faculty and two high school students and two faculty and four high school students were both lower than the anxiety scores generated by two faculty ($p < .05$), whereas the anxiety scores of the mixed condition of two undergraduates and four high school students were higher than those of two undergraduates ($p < .05$). These contrasts were nondirectional planned comparisons. The anxiety scores of the mixed condition of two undergraduates and two high school students did not differ from those of two undergraduates.

These results are consistent with the predictions of a weighted averaging interpretation. According to this analysis, the addition of a low status member to an audience can raise or lower felt anxiety depending on whether the scale value of the added member is above or below the weighted average of the subject's initial concern level and that of the other audience members. When low status members are added to an audience of high status faculty, the low status members' presence would be expected to lower anxiety. The addition of these low status members to an audience of high status members would be expected to lower the combined average of these low status members, the high status members, and the subject's initial concern level. However, when these same low status members (who are above the subject's initial concern level) are added to an audience of undergraduates who have only slightly higher status than the low status members, this decrement in anxiety should not be observed to the same extent as would be the case if the existing members were high in status. In fact, as indicated in the beginning of this article, and as found, their inclusion could actually raise felt anxiety.

### Experiment 2

The results of Experiment 1 and those of J. J. Seta et al. (in press) support the notion that the impact (e.g., felt anxiety) of evaluative sources of information (e.g., audience members) is at least in part a function of the average influence of each source. Therefore, in an audience setting individuals appear to average the influence of each person in a manner similar to the way people evaluate trait information in impression formation. The audience and impression formation situations are similar in that discrete units of information (people or traits) help define the group or target person. In the impression formation setting, each bit of trait information helps define a particular person, whereas in the audience setting each person helps define the group. However, according to the averaging-summation model described in the beginning of this article, the way in which evaluative sources of information (e.g., audience members) affect individuals may be similar but not identical to the way individuals typically integrate trait information in impression formation. Specifically, in an audience setting each person can be an additional source of potential consequences to the performer. Therefore, if our analysis is correct, people should also be sensitive to the accumulated effect of group members, and the impact associated with an audience should not only be a function of the average influence of each member but also a function of the summative influence of all group members.

The averaging-summation model makes some interesting predictions that are counter to a weighted averaging formulation. For example, adding a few low expert members to a highly evaluative audience can lower anxiety because the average impact of the group is being significantly reduced while the sum-

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Table 2

<table>
<thead>
<tr>
<th>Audience size</th>
<th>Low</th>
<th>High</th>
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<tbody>
<tr>
<td>Status</td>
<td>Audience composition</td>
<td>$M$</td>
</tr>
<tr>
<td>High</td>
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performed an analysis on only the homogeneous groups and then used this error variance to conduct nondirectional planned comparisons between the means discussed in the text. The findings were statistically identical to those reported in the text.
mative impact is only being marginally increased. The summative impact will be primarily affected by adding many low expert audience members to a smaller group of highly expert members. This would marginally affect the group's average impact. Consequently, this manipulation would increase anxiety to a level above that generated by just the highly expert members alone. Once the group comprises predominantly low expert members, the addition of more same-status members will not significantly change the average impact but would still change the summative impact of the group. Thus, this model predicts that although the addition of two high school students to a group of two faculty can be anxiety reducing, the addition of 25 high school students can be anxiety inducing. Results of this type could not be easily accounted for by a weighted averaging model. We designed Experiment 2 to test these predictions.

Method

Subjects. Forty-nine female students between the ages of 18–25 attending the University of North Carolina at Greensboro took part in the experiment. Subjects were drawn from introductory classes in psychology.

Design and procedure. We used a 3 X 5 within-subjects repeated measures design. Subjects were exposed to audiences of all faculty, all high school students, and audiences of both faculty and high school students (i.e., mixed condition). We included five different audience sizes in the design. The all faculty and all high school audiences included 2, 4, 8, 16, or 32 members. The mixed audiences (faculty and high school students) comprised 2 faculty and 2, 4, 8, 16, or 32 high school students (e.g., 2 faculty and 2 high school students, 2 faculty and 4 high school students). The procedure was identical to that of Experiment 1. Subjects participated in groups of approximately 15 students.

Results and Discussion

The means of the self-report anxiety score for each of the 15 experimental conditions are contained in Table 3. An ANOVA revealed a significant audience size main effect, F(4, 192) = 34.75, p < .01; a significant audience type main effect, F(2, 96) = 70, p < .01; and a significant Audience Size X Audience Type interaction, F(8, 384) = 8.71, p < .01. The audience type main effect indicates that subjects were more anxious in front of faculty than in front of high school students. The audience size main effect indicates that subjects were more anxious in front of large than small audiences. As can be seen from Table 3, the Audience Size X Audience Type interaction was primarily a result of the fact that, although audience size increased felt anxiety in all three audience type conditions, it had its most dramatic effect in the homogeneous low status condition.

The major purpose of Experiment 2 was to distinguish between the averaging and the averaging-summation models. Consequently, we performed relevant nondirectional planned comparisons. These comparisons indicated that the average felt anxiety of subjects in the combined mixed conditions of 2 faculty plus 2 high school students and 2 faculty plus 4 high school students were lower than the average anxiety scores generated by 2 faculty (p < .05). This replicates the averaging effect found in Experiment 1. However, the felt anxiety in the mixed condition of 2 faculty plus 32 high school students was higher than that of 2 faculty (p < .05). This pattern of data does not support a weighted averaging formulation. Rather, these data support the notion that, within an evaluative context, individuals are sensitive to both the average as well as the summative consequences of the group.

Counter to an averaging formulation, audience researchers have concentrated on the summative nature of evaluative sources. They have commonly assumed that in an evaluative context the addition of an audience member would either increase or have no effect on anxiety (e.g., Cottrell, 1968; Paulus & Murdoch, 1971). Although the results of the present investigation indicate that some form of averaging is necessary to understand how heterogeneous evaluative sources affect anxiety, they also indicate that the type of averaging typically found to describe the integration of trait information about a single individual is not sufficient to account for the audience situation. Although similar, the way in which one integrates trait information in forming an impression is not identical to the way people within a group affect one's perceptions of anxiety. The impact associated with an audience (an evaluative setting) seems to be a function of the average influence of each member as well as the accumulated influence of all its members.

Experiment 3

The pattern of results found to characterize subjects' felt anxiety in Experiments 1 and 2 is different from the summative effects predicted by many approaches to social facilitation. It is entirely possible, however, that the averaging effect reflects performers’ anticipated anxiety and not the anxiety that they would actually feel if directly in the evaluative context. Consequently, although the combined results of Experiments 1 and 2 support the notion that anxiety in an audience setting reflects both averaging and summative processes, it does so only when the dependent measure is subjects' self-reports of their anticipated level of anxiety. Experiment 3, then, was designed to assess whether performance levels reflect these processes in an actual audience setting. To test this notion, subjects performed either alone or in front of an audience of either one high and one low status member or in front of just one high status member. Subjects in front of an audience consisting of one high status member should produce more anxiety and worse performances than subjects performing alone. This finding would be indicative of the typical social facilitation effect in which adding an observer produces anxiety that then debilitates complex task performance. However, if the results of Experiments 1 and 2 are generalized to performance, subjects performing in front of one high and one low status member should produce less anxiety and better performance than an audience of one high status member. This finding would be indicative of an averaging effect in a heterogeneous audience performance setting.

3 Because each additional member can have marginally decreasing impact, there may be situations in which group size additions do not reverse the effect of our initial lower status addition to the audience. Nevertheless, the addition of many members should increase impact.

4 As in Study 1, the manipulation of size and status is not purely orthogonal. Consequently, we performed a similar analysis as in Experiment 1. The comparisons using this method (nondirectional planned comparisons) were statistically identical to those reported in the text.
Method

Subjects. Thirty-six female undergraduate students from introductory psychology classes at the University of North Carolina at Greensboro served as subjects.

Design and procedure. We used a univariate between-subjects design in the present study. Audience composition made up the three levels of the between-subjects variable. The three levels of this variable were (a) alone, (b) one high status audience member, and (c) one high status and one low status audience member. High status was operationalized as a PhD psychology faculty member, low status as a high school freshman.

The task performance measure, used as a behavior indicator of anxiety in this study, was the paired-associates learning task developed by Spence, Farber, and McFann (1956), which has high interresponse item proper- ties and was used in this study. Relay and response terms were presented sequentially on a TV screen placed directly in front of the participant. Participants also completed the state version of the Spielberger State-Trait Anxiety Inventory (A-State; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

All participants were run individually in an experimental room containing a computer connected to a TV set. There was another TV set attached to a boughs closed-circuit TV camera. This TV set was actually connected to a videocassette recorder in the accompanying room. This camera was placed behind and to the left of the participant's chair. The camera remained covered at all times except during the audience manipulation. Finally, there was an audiocassette tape recorder for recording the participants' responses on the paired-associates task.

On entering the experimental room, participants were told they were going to participate in a research project designed to examine the effects that being observed has on learning. The nature of the paired-associates task was described. Following task instructions, participants assigned to audience conditions were told they would be observed over the closed-circuit TV camera connected to the lab on another floor of the building. Depending on the condition, subjects were told that they would be observed while they were working on the learning task by either a female PhD psychologist faculty member or a female PhD psychologist faculty member and Sarah, a high school freshman working on an honors project in psychology being assisted by the faculty member.

The mean anxiety ratings from the A-State are as follows:

Table 3

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<thead>
<tr>
<th>Audience type</th>
<th>Audience size</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2 high</td>
</tr>
<tr>
<td>Homogeneous–high status</td>
<td>62.51</td>
</tr>
<tr>
<td>Heterogeneous–mixed status</td>
<td>58.16</td>
</tr>
<tr>
<td>Homogeneous–low status</td>
<td>27.55</td>
</tr>
</tbody>
</table>

Results and Discussion

We performed an ANOVA on the errors made on the paired-associates task in each of the three conditions. The ANOVA revealed a significant main effect for audience composition, F(2, 33) = 3.72, p < .05. Nondirectional planned comparisons indicated that high status audience condition subjects made significantly more errors (M = 14.08) than did those working alone (M = 8.33, F = 6.28, p < .025), and they made significantly more errors than subjects in the mixed condition of one high and one low status audience member (M = 9.08, F = 4.57, p < .05). The performance levels of alone and mixed condition subjects did not differ significantly (F < 1).

The mean anxiety ratings from the A-State are as follows:

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the social anxiety generated in audience designs. Nevertheless, a Pearson product–moment correlation revealed a significant positive correlation between number of errors on the paired-associate task and state anxiety ratings ($r = .45; p < .01$). Therefore, as errors increased, anxiety level also tended to increase. The individual within-group correlations are as follows: (a) alone condition, $r = .67 (p < .025)$, (b) high status condition, $r = .42 (p = .18)$, and (c) mixed status condition, $r = .23, ns$.

Taken as a whole, these data indicate that subjects experienced more anxiety (as indicated by self-report and performance scores) when working in front of one high status audience member than when working alone or in front of one high and one low status member. These results support the averaging prediction of the averaging–summation model of evaluation in a "typical" audience setting. According to averaging, more anxiety should be generated by an audience of one high status member than an audience of one high status and one low status member.

**General Discussion**

Many theories within the evaluation and audience areas rely on performers' perceptions (e.g., Baumgardner & Brownlee, 1987; Carver & Scheier, 1981; J. J. Seta & Seta, 1983). Therefore, from these perspectives a complete account of performance in an evaluative setting must include an analysis of how various evaluative sources of information are integrated. Unfortunately, although this is an important topic, it has been largely ignored within audience research. This article suggests that this is an important topic for exploration. Although research within the social facilitation literature has generally assumed that the addition of an evaluative audience member will either increase or have no effect on arousal or anxiety, it appears that individuals often average evaluative sources.

From a weighted averaging perspective, the way people within a group affect one's perception of anxiety may be conceptually identical to the way people integrate trait information in forming impressions. An implicit question within this perspective is whether the perception of groups is analogous to how impressions are formed. These settings are similar in that discrete units of information (people or traits) help define the group or target person. In the impression formation setting each bit of trait information helps define a particular person, whereas in the audience setting each person helps define the group. Therefore, in the audience setting, individuals may average the influence of each person in a manner similar to the way people average traits.

If a weighted averaging model could fully account for the evaluative audience setting, variations in the number of observers should not result in deviations from averaging. The results of Experiment 2 indicate that an averaging model, without modification, could not account for subjects' felt anxiety in heterogeneous settings. The addition of a few low status audience members to a group of high status members lowered felt anxiety, but the addition of many low status members raised felt anxiety.

To preserve a weighted averaging model, one could argue that the reason for the differences between our findings and those in the impression formation literature is that different units of analysis are used in the two situations. In the impression formation setting, the trait is the unit of analysis and the unit that is averaged. In the audience setting, the unit would be the subgroup. Therefore, the differences between the impression formation and audience settings would be in the way information is categorized. Variables such as the size of the subgroup would determine its scale value or concern level. Large subgroups of low status members would have a scale value or concern level above that of small subgroups. For this approach to account for these effects, the concern level of the subgroup of 2 high school students would have to be below the combined average of the 2 faculty and the subject's initial concern level. In addition, the concern level of the subgroup of 20 high school students would have to be higher than that of the combined average of the faculty and the subject's initial concern level.

Although people can and often do categorize audiences into subgroups, and although the question of how we categorize information is certainly important, it is not sufficient to conclude that because the scale value of large subgroups can be greater than that of small subgroups, individuals are not sensitive to the summative influence of group members. Because each subgroup is composed of individuals, the anxiety associated with the subgroup is itself a product of an integration of individual group members. It is the summative influence of each group member that can make a subgroup of 20 more anxiety provoking than a subgroup of 2.

**Averaging and Summation**

In this article we have tested the new aspect of our analysis: an individual's simultaneous sensitivity to averaging and summation. In the beginning of this article, we proposed a model that captures the concepts of averaging and summation. However, there are other mathematical models that can describe the averaging–summation aspects of our analyses, and the present series of experiments was not designed to test these competing formulations. Nevertheless, it is clear that neither averaging nor summation alone can account for our data.

In this section we discuss two additional models of averaging and summation. Although social impact theory (e.g., Latané, 1981; Latané & Harkins, 1976) has traditionally been applied to homogeneous audience arrangements, one could incorporate an averaging rule into social impact to account for both homogeneous and mixed audience effects. Specifically, if subjects average the overall strength (e.g., status) of the group, then social impact theory could predict that the addition of new members could either reduce or increase impact depending on how the addition of new members changes status. If the addition of new members does not change status (as would be the case for homogeneous audiences), increments in audience size would increase impact in a linear manner when expressed in log-log terms. If, however, the addition of new members reduces status or strength (as would be the case when low status members are added to high status members), then increments in the number of low status members could decrease impact as long as the decrease in status is sufficiently large to overcome the increase in the audience's size. An alternative approach would be to maintain the weighted averaging rule as described in the Averaging and Summative Process Analysis section and incorporate Latané's social impact theory.
tané's complete social impact model (in which strength, immediacy, and number are included) to describe the summative aspect of the averaging–summation model. In this case, strength, immediacy, and number would all contribute to summation.

**Implications of Averaging and Summation**

An individual's sensitivity to both averaging and summation, which we have described, should not be restricted to audience members. There are many situations in which there are a variety of different sources of affect and stress. For example, a ballplayer might be concerned about winning a game because victory would secure individual honors and because winning would secure a championship for his or her team. Given that both of these pressures are not equally important to the player, he or she may actually feel less stress in the ballgame when there are moderate sources of stress than when there is only the single strong stressor in the setting. Stressors are similar to the audience situation in that the nature of the stressors (like group members) help define the life event. Consequently, individuals may average each stressor. However, each stressor also has a diminutive effect on an individual's resources. Therefore, stressors may also have an accumulated effect on individuals. In the stress literature (just as in the audience area), researchers have assumed that stressors have a summative but not an average influence (e.g., DeLongis, Folkman, & Lazarus, 1988). This model offers an interesting direction for research in this area.

In addition, this model is not restricted to changes in felt anxiety in an audience setting but speaks to a variety of reactions to audiences. For instance, a mixed audience of two faculty and two high school students can not only be less anxiety provoking than an audience of just two faculty but can also be less motivating. Individuals may be less willing to expend effort and other resources to please the mixed audience of two faculty and two high school students than an audience of just two faculty. The quality of the individual’s performance would, then, be a function of the performer’s willingness to expend resources as well as subjects’ capability of performing as partly determined by the performer’s anxiety level (C. E. Seta, Seta, Donaldson, & Wang, 1988; J. J. Seta & Seta, 1983).

From the averaging–summation analysis, one can make novel predictions within other social influence areas. For example, not only should people be sensitive to the summative conformity pressures of a group, but they should also be sensitive to the group’s average influence. Within this setting, summation should be most pronounced for a group’s normative influence and averaging most pronounced for its informational influence. In considering the correctness of a position, an individual primarily considers the relational merits of each view. The group’s normative influence, however, involves consequences that can significantly alter the individual’s social position. Consequently, for this aspect the group’s accumulated effect may be more pronounced.

In conclusion, we have presented a model that is built on the assumption that people average and summate the influence of individual sources of evaluation, stress, or information. The results of these experiments suggest that individuals’ perceptions of anxiety and their performance levels in front of audiences are a function of both averaging and summative tendencies. These findings are contrary to the prevalent theoretical perspectives within this area of research. We presented an alternative model of affective source integration that describes individuals’ reactions to an audience in terms of both averaging and summative processes. This model assumes that individuals are sensitive to both the central tendencies (an average impact) and the accumulated effects (summative impact) of important life events. Therefore, this model offers an interesting new direction for research in other domains in which there are multiple sources of impact (e.g., crowds, affective responses).

**References**


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