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Emotion Elicitation Using Films

Research on emotion has undergone explosive growth during the past few decades, marked by new theories (e.g., evolutionary analyses; Tooby & Cosmides, 1990), methods (e.g., anatomically based systems for coding facial expressive behavior; see chapter 13, this volume), and findings (see Cacioppo & Gardner, 1999). Some of the research in this area has been correlational, focusing on factors that naturally covary with emotional processes, such as chronological age, physical health, or social status. However, experimental research also has flourished, focusing on emotional processes in the context of relatively well-controlled laboratory environments. Our chapter on the use of emotion-eliciting films, like many of the contributions to the *Handbook of Emotion Elicitation and Assessment*, lies squarely within this second, experimental tradition.

Scientists who take an experimental approach have had at least two distinct motives for eliciting emotion. First, emotion has been used as an independent variable in manipulations that demonstrate the important contribution made by emotion to a diverse array of phenomena, ranging from aggression (Zillman & Weaver, 1999) to helping behavior (Isen, Daubman, & Nowicki, 1987). Second, emotion has been used as a dependent—or outcome—variable in work that has illuminated several emotion-related phenomena, such as self-reported experience (Duclos & Laird, 2001), facial expressive behavior (Ekman, Friesen, & Ancoli, 1980), autonomic or central nervous system activation (LeDoux, 1996; Levenson, 1988), and individual differences in emotion responding (e.g., Gross, Sutton, & Ketelaar, 1998; Rottenberg, Kasch, Gross, & Gotlib, 2002).

Whatever their motivation for studying emotion, experimentalists have required a reliable means of eliciting emotion in an ethically acceptable fashion. Happily, investigators have made vast improvements over the buckets of frogs (Landis, 1924) and other ad hoc measures of the past, moving toward more tightly controlled and replicable emotion elicitation procedures. Indeed, as the other chapters in this volume attest, many different emotion elicitation techniques have now come to fruition, including images and sounds (Bradley & Lang, chapter 2; Wiens & Öhman, chapter 5, this volume), expressive behavior (Ekman, chapter 3; Laird & Strout, chapter 4, this volume), scripted and unscripted social interactions (Harmon-Jones, Amodio, & Zinner, chapter 6; Roberts, Tsai, & Coan, chapter 7, this volume), and music (Eich, Ng, Macaulay, Percy, & Grebneva, chapter 8, this volume).

The development of films as emotion elicitors has paralleled this wider maturation of emotion science. For much of the past half-century, researchers have selected individual film clips using relatively informal criteria, often to elicit a diffuse state of anxiety or stress (e.g., Lazarus, Speisman, Mordkoff, & Davison, 1962). In fact, until recently, the empirical record concerning films was scanty, prompting reservations about the reliability and validity of film-based emotion induction procedures (Polivy, 1981). There have been two notable efforts to build a scientific database

concerning films by formalizing film selection criteria and assembling a standardized library of emotion stimuli capable of eliciting specific emotional states. Philippot (1993) presented normative viewing data ($N = 60$) from a set of 12 film clips that elicited six emotional states and reported success for stimuli that elicited amusement, sadness, and a neutral state. Gross and Levenson (1995), also working from a discrete emotions perspective, presented normative viewing data ($N = 494$) from 16 films targeting eight emotions and reported success for stimuli that elicited amusement, anger, contentment, disgust, sadness, surprise, a neutral state, and, to a lesser extent, fear.

As emotion science has matured, the palette of viable emotion elicitation techniques has grown. Increasingly, investigators face a baffling array of techniques to elicit emotion. Unfortunately, the published literature offers little explicit guidance on these issues, forcing investigators to base their decisions on informal rules of thumb, idiosyncratic training experiences, or personal communications. With these needs in mind, we intend this chapter to be a guide for investigators contemplating the use of short film clips to elicit emotion. In the sections that follow, we first outline the general task of eliciting emotion in a laboratory. Second, we compare the properties of films to other laboratory emotion induction procedures. Third, we discuss how to use films in different experimental contexts and avoid potential pitfalls. Fourth, we offer examples of films that have worked well in our own research applications. Finally, we close with reflections on the future evolution of films as an emotion elicitation procedure.

Eliciting Emotion in the Laboratory

Historically, the task of eliciting emotion in the laboratory has been made all the more difficult because emotion itself has been such an elusive construct. With different investigators employing their own idiosyncratic and often widely discrepant definitions of emotion, it is no wonder that there has been considerable confusion as to which procedures reliably elicit emotion. Fortunately, affective scientists have increasingly moved toward a consensual understanding of key affective processes, a move that has greatly facilitated the systematic study of these processes (Ekman, 1992; Russell, 1991).

Here we follow common usage and view emotions as a transient but coordinated set of responses that occur when an individual faces a situation (real or imagined) that is relevant to salient personal goals. Like others, we view emotions as being *multicomponential*, typically involving changes in cognitive, experiential, central physiological, peripheral physiological, and behavioral response systems (Lang, 1978). For example, anger may be reflected by thoughts concerning revenge, feelings of great distress, an elevated heart rate, and an attack on the source of one's anger. Finally, like other contemporary researchers, we distinguish emotions from other affectively laden concepts. For example, compared with an emotion, a *mood* is a longer, slower moving state that is less tied to specific objects or elicitors (Watson, 2000).

Guided by this conception of emotion, laboratory emotion elicitation procedures include a broad array of efforts to evoke a brief affective response in one or more emotion response systems via some type of stimulus. Figure 1.1 highlights several of the key features of the emotion-generative process as it unfolds during a laboratory elicitation procedure (whatever that procedure may be).

The left of the figure draws attention to the fact that emotions elicited in the laboratory usually are not created *de novo* but rather arise from preexisting affective states. Indeed, affect has been understood as a stream with a continuous, or tonic, output (e.g., Russell, 2003). Emotions occur as bursts of activity, or waves, superimposed against the backdrop of this affective stream. The interaction between phasic emotion and tonic affect is not well understood and is clearly an important avenue for future research (Neumann, Seibt, & Strack, 2001). Indeed, an inspection of Figure 1.1 suggests that it is quite difficult to distinguish the waves of emotion from background affective tone, as there are no nonarbitrary criteria for deciding when one phenomenon ends and the other begins. Finally, the different "peaks" within Figure 1.1 illustrate a related complexity—that emotional impulses have no uniform signature and instead exhibit a variable duration and morphology. The notion of affective chronometry (Davidson, 1998) signals the emerging scientific interest in characterizing the variability of the emotion waveform by decomposing it into a number of temporal subcomponents, such as latency, rise time, magnitude, duration, and offset.

It should be noted that Figure 1.1, although useful for heuristic purposes, simplifies the emotion-generative process in many ways. For example, emotional responses are plotted with a single line, a representation that assumes that different emotion response elements (e.g., emotion experience, behavior, and physiology) exhibit synchrony during emotion activation. Theoretically, a high degree of synchrony between emotion response systems has been seen as essential in helping an organism mobilize a response to a challenge (e.g., make a fast getaway when a bear charges; Levenson, 1999). Em-

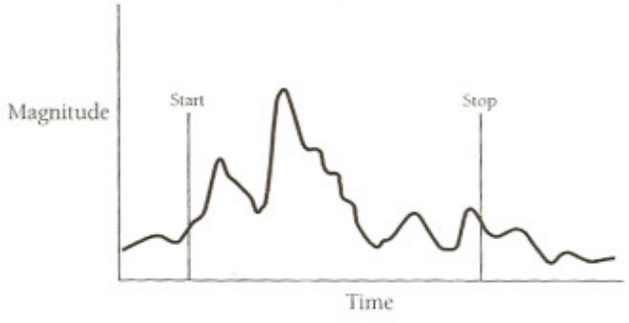

Figure 1.1. Affective responding over the course of a laboratory emotion elicitation procedure.

pirically, however, it is clear that emotional response systems do not covary perfectly in their activity (Gross, John, & Richards, 2000; Lang, 1978), with modest intercorrelations between emotion response systems often obtained (Mauss, Wilhelm, & Gross, 2004; Ruch, 1995), and even dissociated activity observed in some settings (e.g., Lacey, 1967).

Another limitation of Figure 1.1 is that it does not acknowledge the role of individual differences. A growing body of findings demonstrates that individual differences influence emotion generation at every stage of the process. These influences occur as a function of affectively toned traits such as dispositional mood (Watson, Clark, & Tellegen, 1988), emotional reactivity (Kagan & Snidman, 1999), emotion regulatory styles (Gross, 1998), and metaemotions (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), as well as personality traits (Larsen & Ketelaar, 1991; Gross et al., 1998), physical health status (Ritz & Steptoe, 2000), and other subject characteristics such as gender, race, class, and culture (e.g., Vrana & Rollock, 2002). Individual (and group) differences represent an important theme to which we return later.

Because emotion is a multifaceted process about which so much is still unknown, no single technique can serve all purposes for eliciting emotion in the laboratory. Thus the very same properties of a given induction procedure that make it a valuable procedure to probe emotion in many contexts may represent liabilities in others. With an eye to helping investigators decide whether and how films might serve their research aims, we now compare films with other common elicitation procedures.

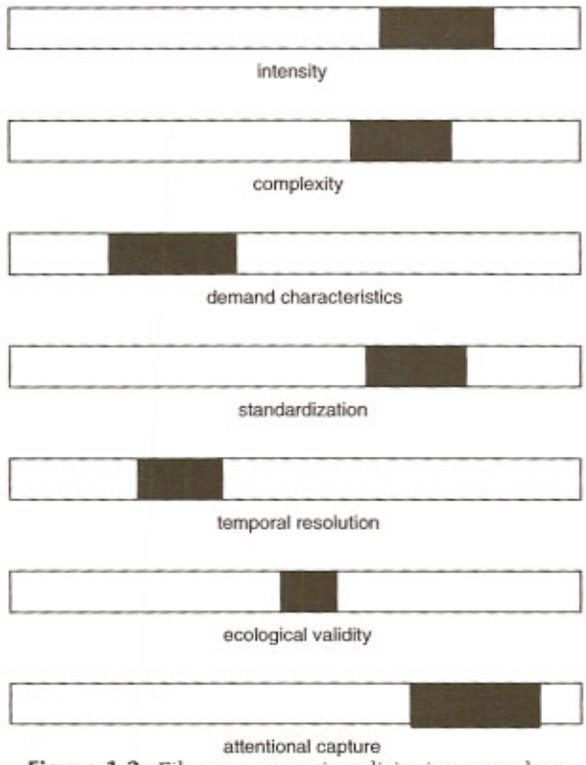

Figure 1.2. Films as an emotion elicitation procedure.

Using Films to Elicit Emotions

A nonexhaustive list of procedures that have been used to elicit emotion in the laboratory includes: images, sounds, self-statements, facial and body movements, scripted and unscripted social interactions, hypnosis, drugs, relived or imagined scenes, music, and odors (see Martin, 1990). These procedures differ from one another in a large number of ways. To facilitate comparisons, we highlight seven key dimensions that are salient to the selection and use of these procedures. The approximate location of films along these seven dimensions is presented in Figure 1.2.

Intensity

Emotional intensity can be viewed in several ways. For present purposes, we consider the intensity of emotional responses in terms of the two conceptually separable (but often correlated) dimensions of (1) response strength and (2) response breadth.

Experimentalists face important ethical constraints regarding the strength of the emotional responses they may elicit, even when participants are carefully selected and debriefed. The experience of intense negative emotions can be painful and traumatic, and even the experience of intense positive emotions can be associated with a loss of control that is aversive. Films are capable of eliciting mild or strong emotional responses. For a number of positive and negative emotions, films rival or exceed the response strength that can be elicited ethically with other procedures.

The relative potency of films may be due in part to the intrinsic power of carefully crafted, external, and dynamically varying stimuli. We suspect it is also due to the relatively permissive cultural mores that surround film emotion. In the United States and other Western countries, cinema and television traffic widely in graphic and emotionally explicit material, and it is likely that the presence of these media gives experimenters who use films a somewhat freer hand to elicit strong responses (even negative ones) without creating a sense of harm or ethical violation. By contrast, other procedures, such as hypnosis or confederate procedures that elicit strong negative states, may be readily perceived as deceptive or manipulative, and the effects of these induction procedures may be quite difficult to remove via debriefing (Ross, Lepper, & Hubbard, 1975).

There is also good evidence that films are capable of eliciting activations across many of the response systems associated with emotion (e.g., experience, behavior, autonomic and central physiology; Averill, 1969; Gross & Levenson, 1993; Karama et al., 2002; Palomba, Sarlo, Angrilli, Mini, & Stegagno, 2000). To the extent that investigators want to elicit broad, multisystem responses, films may hold advantages

over other procedures. Anecdotal evidence suggests that self-statements have somewhat weaker effects on behavior and physiology; facial movement has relatively weaker effects on experience; and music has relatively weaker effects on physiology. Published data indicate that, whereas some film clips are capable of generating multi-system activations (e.g., Rottenberg, Gross, Wilhelm, Najmi, & Gotlib, 2002), many film clips will not. One difficulty in sorting out this issue is that films, like many elicitation procedures, are generally normed only on the basis of self-reported emotion experience (a limitation of film validation procedures that is discussed more fully later). In light of the relatively loose coupling among emotion response systems, even the most robust self-reported norms provide no guarantee that a film will generate behavioral and physiological activations.

Complexity

When considering the complexity of films, what is perhaps most striking is the variability of film clips on this dimension. A film can be a still, silent image, such as a fixation cross or test pattern, or a dynamic visual and auditory sequence that depicts complex themes. In their traditional incarnation, the film clips that are used for emotion induction tend to be dynamic, multimodal, and reliant on meaningful narrative. Given these features, therefore, most emotion-eliciting films will be relatively high in cognitive complexity. Indeed, even a very simple film, such as a sequence depicting an arm being amputated (e.g., Gross & Levenson, 1993) likely requires considerably more appraisal (Frijda, 1988) than competing procedures to elicit disgust, such as ingesting a bitter taste (reliant on a primitive reflex). On the one hand, films share with other narrative-based procedures (e.g., relieved emotion tasks) the ability to elicit cognitively sophisticated emotional states such as nostalgia. On the other hand, films impose relatively high levels of cognitive demand on participants—potentially a drawback when testing special populations, such as young children, infants, or cognitively impaired adults (e.g., those with schizophrenia).

Attentional Capture

Emotion elicitation procedures also vary in how much of participants' attention they require to operate. Masked stimuli make limited demands on attention and operate on emotion almost totally outside of participants' conscious awareness (see Wiens & Öhman, chapter 5, this volume). By contrast, the Velten (1968) procedure directs participants to read a series of emotional self-statements, a task with high attentional requirements that preclude performance of most other concurrent tasks (e.g., filling out questionnaires, answering interview questions). As a dynamic display that engages both visual and auditory modalities, film clips are also typically fairly high in attentional capture. In fact, film effectiveness can be degraded by competing demands placed in either modality (e.g., gradient coil noise). Therefore, films may be a suboptimal procedure in experimental settings in which participants must carry out a secondary task (e.g., mental arithmetic).

Demand Characteristics

Films are embedded in experimental contexts that vary considerably in their level of demand. Some experimental cover stories are more likely to provoke demand (e.g., the film is part of a neuroticism test) than others (e.g., the film is part of a memory test). Likewise, the specific instructions that accompany film viewing also influence demand. For example, before showing a sad film, Marston, Hart, Hileman, and Faunce (1984, page 128) presented the instructions, "Let yourself experience whatever emotions you have as fully as you can, don't try to hold back or hold in your feelings." In part out of demand concerns, we (for this film, *The Champ*, and for others) use the simpler instructions to "please watch the film carefully." Finally, film demand characteristics are also film-content-dependent. A film depicting a man eating dog feces suggests a fairly transparent intent to elicit disgust, whereas the intent of a film depicting landscape scenery is relatively opaque.

Bearing all of these caveats in mind, film clips can elicit emotion with relatively low levels of demand. Furthermore, films often generate effects in response systems that are typically seen as being outside of participants' volitional control (e.g., heart rate). By contrast, procedures such as self-statements, relived emotion, and hypnosis almost invariably contain strong cues concerning the targeted affective state. These cues may be less obvious for directed facial movement or confederate procedures; these procedures are thus probably lower in demand than films.

Standardization

Although threats to standardization are present in any laboratory procedure, the stimulus content, presentation apparatus, and viewing conditions can all be tightly controlled with film clips. The standardization of films is therefore high, allowing for the potential replication of effects across laboratories (Gross & Levenson, 1995). Films share this high degree of standardization with other normative media, such as slides and music. Confederate interaction procedures tend to be less standardized than films because experimenters cannot totally regiment the dynamic interplay between human participants. Relived emotion procedures are less standardized than films simply because by-person idiographic variation is the source of their power. The high standardization of films does not, of course, guarantee that films will be effective equally for all participants (see later section on individual and group differences).

Temporal Considerations

Emotion researchers differ widely in their requirements for temporal resolution, or granularity. For example, phenom-

ena that are modified by emotion over seconds or milliseconds (such as the startle reflex, event-related brain potentials, or brain activations) require data collection techniques that accommodate a high degree of temporal resolution. Still-picture paradigms (see Bradley & Lang, chapter 2, this volume), in which stimuli are presented in relatively short trials (approximately 6 s) that are averaged together to increase measurement reliability, have been used for this purpose. Films, in their prototypical use, are much lower in temporal resolution and range from about 1 to 10 minutes in length. Because emotions are a relatively rapid phenomenon, with onsets and offsets over seconds, films (and other low-resolution procedures such as confederate interactions) will produce epochs of data that are heterogeneous in emotional activation. Experimenters who use films must consider procedures to extract the emotional phenomena of interest from these longer epochs (e.g., a priori criteria, whole period averages), an issue also discussed in more detail later.

Ecological Validity

Like many of the stimuli that make us emotional in real life, film clips represent a dynamic display of prototypic situations relevant to well-being and survival (e.g., loss, danger; Tooby & Cosmides, 1990). From this standpoint, films appear to be high in ecological validity. At the same time, both theoretical and empirical uncertainty surround this issue (e.g., Ritz & Steptoe, 2000). On the one hand, film emotion appears to be real and robust. For example, about one-third of female participants overtly weep in response to a sad film we have used (e.g., Rottenberg, Gross, et al., 2002), and our best films in other emotion categories produce similar results (e.g., visible gagging to disgust films, convulsive laughter to amusing films). On the other hand, film emotion is a kind of aesthetic emotion (Frijda, 1989) that requires a "willing suspension of disbelief" for its operation. That is, participants become emotional in response to films in spite of (or because of) the fact that film images are an *illusion* of reality.

In sum, although some questions remain concerning the ecological validity of films, films are probably more naturalistic (and hence more generalizable) than a number of other techniques such as directed facial movement or hypnosis, which resemble very few everyday life situations. In situations in which high ecological validity is required, one might do well to employ scripted or unscripted social interaction procedures, as they elicit emotions that are as real and robust as film emotions while requiring no willing suspension of disbelief.

General Considerations When Using Films

Thus far, we have focused on *whether* films are the right emotion elicitation procedure to use in a given research context. In the following section, we consider *how* to use film procedures once one has decided that films are appropriate. With films, as with many techniques used in experimental psychology, the devil is in the details. With this in mind, we discuss several factors that influence how well films work in different settings and offer suggestions for avoiding common pitfalls.

How Should Emotion Be Measured?

Not surprisingly, judgments regarding the success or failure of film-based emotion elicitation efforts often hinge on how emotion itself is measured. Here we discuss two issues relevant to the measurement of emotion when using films: (1) proximity of activation and measurement periods and (2) the extraction of emotion.

Emotions are evanescent. Therefore, delays, even short ones, between the activation of emotion by a film and the assessment of emotion by an experimenter can introduce measurement error. Further compounding this error is the prospect that the time course of an emotional response varies by emotion response system (e.g., facial expressive behavior may have a faster offset than emotion experience). The costs of delay are well illustrated by the common practice of assessing self-report responses to films retrospectively using questionnaires. As time elapses between the film's end and the questionnaire's completion, the elicited affect is likely to fade and/or be distorted by errors or systematic biases in recall (Levenson, 1988). To avoid problems associated with delayed retrospective reports and to obtain continuous measures of experience that parallel continuous measures of other response domains (e.g., behavior and autonomic psychophysiology), there has been a growing interest in rating dial methodologies, which afford continuous measures of emotion experience, in either online or cued-review rating formats (Fredrickson & Kahneman, 1993; Gottman & Levenson, 1985; Ruef & Levenson, chapter 17, this volume)

One concern about frequently assessing emotion experience is that the act of repeated measurement can potentially alter the emotional response itself, a concern that does not apply as strongly to the physiological and behavioral response systems, which may be monitored continuously without interfering substantially with emotional responses. Decisions regarding when and how to assess emotion experience require that the experimenter balance the desire for valid and perhaps even continuous emotion experience reports against the competing desire not to interfere with emotional responding during film and postfilm (recovery) periods. In our own work, we typically assess central and peripheral physiological responses, videotape expressive behavior, and—depending on the study—use a mix of retrospective and real-time emotion experience ratings.

A second measurement issue concerns the extraction of emotion from film viewing periods. Many researchers—ourselves included—have relied on overall period averages to measure experiential, behavioral, and physiological reactivity during a film clip. Overall average response is a useful

summary statistic and provides an important starting point for data analysis. At the same time, we have alluded to the fact that films have relatively low temporal resolution and typically create heterogeneous epochs of data. This means that the period average strategy will almost invariably include nonemotional epochs and/or epochs in which nontargeted emotions were elicited, effectively "watering down" the emotion data of principal interest. Furthermore, an exclusive focus on overall averages may detract from other potentially informative parameters of emotion (e.g., threshold, rise time, variability). One promising alternative to period averages is to extract time windows of data based on a priori response criteria—such as rating dial measures of emotion experience, facial movements that match intended prototypes (Rosenberg & Ekman, 1994), or behavioral or physiological profiles indicative of the target emotional state (Davidson, Ekman, Saron, Senulis, & Friesen, 1990).

What Kind of Baseline Should Be Used?

However one measures emotion, and whichever way one extracts particular periods of interest, it is necessary to estimate the impact of a film compared with some point of reference. In fact, because acute emotional responses are usually superimposed on some prior affective state, it is difficult, if not impossible, to draw inferences about the nature of a film effect without a relevant baseline period. Thus another basic issue for implementing film procedures is establishing a proper point of comparison, or baseline, against which to assess the effects of a given film clip.

What type of baseline should one use? Historically, a resting state has been a major workhorse. In our experience, however, there are drawbacks associated with resting baselines: (1) rest may not be a representative state of the organism; (2) it may create a floor that precludes detection of deactivation effects; (3) rest instructions may introduce unwanted variability, as participants differ radically in their ability to comply (see also Christoff, Ream, & Gabrieli, 2004; Levenson, 1988). To avoid these drawbacks, we have in our own work moved toward use of neutral-emotion-film baselines (e.g., Rottenberg, Gross, et al., 2002). In addition, a film baseline also has the desirable feature of controlling for the effects of viewing a dynamic external stimulus (Piferi, Kline, Younger, & Lawler, 2000). Specific relatively neutral film clips are recommended for baseline later in this chapter.

Even when a baseline has been well constructed, it will not be useful as a comparison condition unless it is timed appropriately. Levels of responding in experiential, behavioral, and physiological channels are never static but drift, or fluctuate, throughout a laboratory session. Delays between baseline and activation periods introduce the confounding effects of time. Therefore, it is often useful to have multiple baseline periods, and baselines must be positioned temporally proximal to the emotion film (ideally in a contiguous position). In designs that employ multiple emotion films, the issue of response drift is acute and strongly militates for the use of multiple baselines.

How Can Film Clips Be Matched?

A related consideration is how to best match films to allow strong inferences about emotion effects. That is, when two (or more) emotion film conditions are compared, emotion researchers will usually want to infer that observed condition effects are due to emotion rather than film differences. The complexity of films complicates this inference: Films differ from one another on a large number of potentially confounding characteristics (e.g., length, intensity, complexity, core themes, presence and number of human figures, color, brightness, picture motion; see Detenber, Simons, & Bennett, 1998). Moreover, investigators usually have few degrees of freedom in matching stimuli on these characteristics because: (1) the pool of effective films available for any given target emotion is often small (i.e., 2–5 films); (2) the number of possibly relevant dimensions of difference among films is so large; and (3) even slight variations in the editing of film clips can dramatically alter their effectiveness as emotion elicitors.

Because it is rare that films can be matched across all characteristics, investigators must match along a few characteristics that have the highest priority. In our own work we have matched films based on length, theoretically important dimensions (e.g., activation level), known effects in the literature, and study-specific aims (e.g., an investigation of stimulus meaning matched films on thematic content; Rottenberg, Gross, & Gotlib, 2005). Decisions about matching should be made explicitly, with reference to the goals of the particular study.

How Many Film Clips Should Be Used?

Our discussion of baseline and of film stimulus confounds have suggested several noise sources that can obscure the "signal" of emotion. How can one boost this signal? One approach is to sample emotion for extensive periods by using several film exemplars for a given emotion and/or very long stimulus presentations. Indeed, psychometric theory argues that aggregation over multiple film exemplars (and long films) should increase measurement reliability (Epstein, 1983).

However sensible this approach to sampling emotion may be, it is often problematic to carry out in practice because: (1) different films designed to target a particular emotion do not always generate equivalent responses; (2) the risk of habituation, sensitization, or fatigue effects increases with more film presentations; (3) longer films are more heterogeneous and often less effective than shorter films (e.g., long neutral films can become aversive); and (4) practical constraints related to participant availability and attention span often make it impossible to use multiple exemplars for each

target emotional state. For these reasons, we have used a compromise sampling strategy in our own research: For each target emotion we use one (or two) relatively short film stimuli that are typically between 1 and 3 minutes in length and that are as homogenous as is possible. Our strategy to boost the signal of emotion therefore places a heavy burden on stimulus selection (and reducing sources of noise).

What Is the Psychological Context During Film Viewing?

The sensitivity of emotion to psychological context is an interesting (and bedeviling) aspect of emotion that can disrupt the standardization of film elicitations of emotion. Films are often shown in the context of complex, multisession studies, in which participants complete questionnaires, have sensors attached, are videotaped, and interact with one or more experimenters. Although an investigator may be particularly interested in participants' emotional responses to one aspect of this complex experience (i.e., the films), it is important to remember that several aspects of the experimental protocol may trigger emotional responses that compete with (and even supersede) participants' emotional responses to the film clips. Of course, it is impossible for an investigator to control (or even to be aware of) *every* aspect of the psychological context. Nevertheless, three aspects of the psychological context stand out as threats to standardization and can be controlled and/or monitored: (1) timing, (2) order, and (3) prior viewing.

A first consideration is timing, or *when* a film is presented in the course of a laboratory session. It would be unwise to assume that a sad film presented at the end of a grueling 2-hour laboratory session will be evaluated in the same way as it would at the beginning of the session, given the greater likelihood of increased participant fatigue (Morgan, 1920) and reactivity to repeated laboratory tasks (Thompson & Spencer, 1966). A second consideration is the order in which a film is presented within a laboratory session. For example, certain orders of film presentation may be more susceptible to carryover effects than others. Several studies indicate that residual affective states that match the valence of a new emotion stimulus will enhance the response to the new stimulus (e.g., Branscombe, 1985; Neumann et al., 2001), suggesting that carryover effects are most probable when films of like valence are presented in blocked order. A third element of the psychological context that poses a threat to standardization is the film-viewing histories of participants. Participants often have previous experience with films used in laboratory procedures, simply because many of the best emotion film clips are edited segments of commercially available entertainments. Prior viewing has been associated with a heightened report of the target emotion (Gross & Levenson, 1995), and it may influence the experience of viewing film clips in other ways (e.g., expectation effects).

In our own work, when emotion-specific effects are important to us, we make a point of ensuring that each film occurs in each position within the experimental protocol. We also try to limit carryover from one film to the next using temporal spacing (e.g., with self-report assessment periods), as well as nonemotional distractor tasks (e.g., copying geometric figures; Gross, et al., 1998). With respect to the issue of prior film viewing, we routinely ask participants (both during pilot testing of the films and during the experiment itself) whether they have seen the film before. We then use this information to control for the effects of prior viewing.

Does the Physical Context Matter?

One important determinant of participants' responses to film stimuli is the physical setting in which films are presented. Emotional reactivity to films has been associated with mundane aspects of the experimental situation such as room lighting (Knez, 1995), larger display size (Detenber & Reeves, 1996; Lombard, 1995), warmer room temperature (Anderson, Deuser, & DeNeve, 1995), and color (as opposed to black and white; Detenber, Simons, & Reiss, 2000). Physical setting also includes participants' proximity and access to other people. Laboratory film procedures (like all emotion procedures) are socially embedded phenomena. Individuals may report differing reactions to films as a function of the group size (e.g., whether films are viewed in group or individual session formats), and these effects may differ by emotion (Jakobs, Manstead, & Fischer, 2001). Even within the context of single-subject paradigms, subtle changes in the physical arrangements may influence reactivity via the implied social presence of others (Fridlund, 1992). For example, the presence of video recording equipment in a participant room may increase self-consciousness that dampens or enhances behavioral responses. In our own work, we have used a 20-inch monitor positioned about 5 feet from the participant in solitary film viewing sessions conducted in a living-room-like laboratory room with dimmed lights. Throughout experimental sessions, participants and experimenters are in contact via an intercom. Cameras used to record participants' expressive behavior are discreetly hidden behind darkened glass panels in order to minimize participants' self-consciousness.

What Is the Role of Individual and Group Differences?

A dramatic example of the power of individual differences to influence the outcome of emotion elicitation procedures is hypnotic emotion inductions, which are not usable in the majority (70–75%) of people who not highly hypnotizable (Bower, 1981). Individual differences also influence reactivity to emotion film clips. For example, variations in self-reported neuroticism and extraversion have been shown to influence negative and positive reactions to films, respectively (e.g., Gross et al., 1998). Likewise, biological traits, such as resting electroencephalographic (EEG) asymmetry in anterior

regions of the brain, have also been shown to predict film reactivity (Wheeler, Davidson, & Tomarken, 1993). How one proceeds in the face of these individual differences depends largely on one's research aims. Some researchers (e.g., personality researchers) welcome variation on these factors because these differences are the focus of study (e.g., Berenbaum & Williams, 1995). In other cases, such as work on basic emotion processes (e.g., forms of self-regulation), these individual differences may constitute nuisance variance that interferes with the detection of other subtle yet important effects.

The influence of group membership (e.g., linguistic, gender, racial, or socioeconomic) on emotion film reactivity is at an early stage of investigation and is an important area for future research. Preliminary evidence, however, indicates that the Gross and Levenson (1995) films generalize to other linguistic groups (e.g., German-language speakers; Hagemann et al., 1999). Emotion film effects have also generalized across different ethnic groups in some samples (Gross & Levenson, 1995; Tsai, Levenson, & Carstensen, 2000), but additional study of this issue is needed. Other findings suggest that gender may be a particularly important influence on film reactivity: Women, relative to men, have been shown to exhibit stronger reports of emotional experience (Gross & Levenson, 1995; Hagemann et al., 1999), to be more expressive (Kring & Gordon, 1998), and to exhibit differential neural activations to emotion elicitors (Karama et al., 2002). Treatment of these group differences, we believe, should hinge on one's wider research aims: where group differences are the object of study, individuals with certain group memberships can be oversampled (Canli, Desmond, Zhao, & Gabrieli, 2002); where group differences represent confounds, they can be addressed by screening (e.g., studying each sex separately; Gross & Levenson, 1993) or by using post hoc statistical controls.

In our own work, we are cautious about assuming that film reactivity will generalize across groups in the absence of strong normative data. We have found that the successful use of film clips entails extensive piloting of films and attention to sample composition, and we regularly report the gender and ethnic composition of study participants so as to allow others to better compare our results with their own. If we believe (as we often do) that there may be important gender effects, we may conduct an initial study with a single gender (often women) and then replicate and extend results of this initial study by using a mixed-sex sample. Likewise, for treatment of individual differences, we recommend the use of instruments to screen out participants who have individual difference profiles that might contaminate results and/or collecting data on these individual difference variables to enable post hoc statistical control (e.g., Wheeler et al., 1993). In our own work, we typically obtain a wide array of individual difference measures, most often via the Internet, before the experimental session.

Recommended Film Clips for Eliciting Discrete Emotional States

In this section, we first discuss the process of finding, editing, and validating film clips. We then recommend a number of film clips that meet our criteria for eliciting specific target emotions, drawing in part on the film library described in Gross and Levenson (1995). Toward the end of this section, we consider other film clips that may be useful but that do not target discrete emotions. The number of proven emotion elicitors remains relatively modest. We remark on some of the stumbling blocks that have stood in the way of developing and validating a larger library of films and present recommendations for overcoming these obstacles in future stimulus development.

Developing and Validating Film Clips

Clearly, it would be desirable to have an extensive database of valid film stimuli that rivals those of other normative emotional stimuli (e.g., pictures, words, and sounds). Perhaps most enviable in this respect is the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1995), a database of hundreds of colored pictures that have been standardized on large normative participant samples for judged pleasure and arousal, distributed internationally to scores of researchers, and used extensively in cognitive, social psychological, and biobehavioral studies. The comparatively modest size of the library of well-validated film clips prompts a consideration of obstacles that often arise in the course of developing new stimulus films.

First, films are complicated to develop because, unlike slides, they are embedded within another source. For the foreseeable future, at least, in-house production of emotion films falls beyond the technical, dramaturgical, and financial means of most laboratories. Extracting emotion films from a candidate source is an iterative process that involves a number of steps, including nominating candidate sources, informally screening scenes from candidate sources, frame editing clips taken from candidate sources, collecting pilot data on edited clips, reediting clips on the basis of the pilot ratings (assuming that the initial ratings look promising), and, finally, collecting normative data from participant samples based on the final edited version of the film clip.

In our experience, we have been repeatedly surprised at the fragility of the film extraction process. Often, film segments that are powerfully emotionally evocative in the context of the larger film fail to elicit emotion when the film clip is viewed on its own, particularly if the participant has not seen the film. We also have found that even if a film segment survives its surgery, the emotional impact can vary as a result of relatively minor variations in the editing of either the music, the image, or both.

A second factor that has hindered the development of a large library of films has been a lack of systematic communi-

cation among scholars. Whereas still pictures and other materials are shared widely, uncertainty concerning the fair use of commercial films for scholarly purposes has slowed the development of a centralized repository where film clips might be stored, copied, and distributed. The development of the Internet, however, has made it easier for scholars to develop centralized locations that post frame-editing instructions for generating stimulus films (which does fall under fair use). As we move forward into the future, we expect the Internet will remain an important resource for building the community of researchers who develop and use emotion films.

A third factor that has made it difficult to build a large library of film clips is the disparate (and often incommensurate) film validation procedures. In our own research, we have followed the practice of carefully pretesting each of the films we are thinking of using with a sample that is matched to the intended research population. We collect validation data on 8–10 films at a time in group-format sessions that last approximately 1 hour (fatigue and the duration of films limits the number of films that can be validated). We obtain a broad range of emotion experience reports immediately after each film clip is shown. As is evident from the other contributions to this volume, there are many different ways to assess emotion experience.

The specific emotion terms we usually use span a broad range of theoretically important discrete negative and positive emotional states. We typically also include the term *confusion* to assess how easy it is for the participant to understand the film clip outside the original film context. The use of a wide range of terms allows us to compare films we employ to elicit different target states. Within a given study, we often find it useful to use several terms that converge on a target emotional state so that we may create target composites. For example, in a study of amusement and sadness, we used the rating form shown in Figure 1.3. On the form, participants rate the greatest emotion that was experienced during the preceding film, using both discrete emotion (specific) and dimensional (pleasant vs. unpleasant) terms. Participants rate each term on 9-point Likert (0–8) scales that for discrete

POST FILM QUESTIONNAIRE

The following questions refer to how you *felt while watching the film.*

0	1	2	3	4	5	6	7	8
not at all/ none				somewhat/ some				extremely/ a great deal

Using the scale above, please indicate the greatest amount of EACH emotion you experienced while watching the film.

_____ amusement	_____ embarrassment	_____ love
_____ anger	_____ fear	_____ pride
_____ anxiety	_____ guilt	_____ sadness
_____ confusion	_____ happiness	_____ shame
_____ contempt	_____ interest	_____ surprise
_____ disgust	_____ joy	_____ unhappiness

Did you feel any other emotion during the film? O No O Yes

If so, what was the emotion? _____

How much of this emotion did you feel? _____

Please use the following pleasantness scale to rate the feelings you had during the film. Circle your answer:

0	1	2	3	4	5	6	7	8
unpleasant								pleasant

Had you seen this film before? O No O Yes

Did you close your eyes or look away during any scenes? O No O Yes

Figure 1.3. Postfilm questionnaire used in film validation.

emotions are anchored by *not at all* and *extremely* and that for the dimensional valence item is anchored by *unpleasant* and *pleasant*. We also allow participants to rate any other emotion they may have felt during the film and ask whether they looked away during the film (in which case they may not have seen important parts of the film).

When deciding whether or not a film is efficacious (including the films we recommend here), we have relied on *intensity* and *discreteness* as the two primary metrics. That is, *intensity* refers to whether a film receives a high mean report on the target emotion relative to other candidate films. *Discreteness* refers to the degree to which participants report feeling the target emotion more intensely than all nontargeted emotions. One way to formalize the *discreteness* metric is to use an idiographic "hit rate" statistic that is the percentage of participants who indicated that they had felt the target emotion at least 1 point more intensely than other, nontargeted emotions. Different films that putatively elicit the same target state can be compared statistically by combining intensity and discreteness scores into a success index, in which each intensity score represents a *z* score derived by normalizing intensity scores for all comparison films and in which each discreteness score represents a normalized discreteness value relative to all comparison films. We have recently added to these metrics for judging the success of a film the recommendation that films have high alphas for the target composites and be low in reports of confusion.

We emphasize that our reliance on retrospectively assessed self-reports of emotion (obtained in group-viewing sessions) for film validation is practical, not philosophical. We do not view any of the major emotion response systems (i.e., experience, behavior, physiology) as the "gold standard." Given the loose coupling between emotional response systems, self-report ratings will not perfectly predict which films will produce behavioral or physiological activations. We encourage researchers to collect validation data from as many response systems as possible to afford more precise statements concerning the effects of a given film. We acknowledge, however, that resource limitations often make it impossible to validate film materials using the full range of behavioral and/or physiological measures and the same viewing contexts (e.g., individual sessions) as will be used in the experiment itself.

Our Film Recommendations

Both our emotion film recommendations and the criteria on which they are based build on and extend our past efforts (Gross & Levenson, 1995). In this work, we have generally wanted to elicit specific discrete emotional states (e.g., anger, sadness) rather than more diffuse states of positive or negative activation (Watson, 2000). Therefore, in stimulus development we have searched for films that are relatively high on discrete emotions (the target) and as low as possible on other related emotions. We should note that frequently we have found that our initial intuitions as to how a film clip would work have been wrong, and a film clip that we believed would elicit a discrete state produced what might best be characterized as a diffuse state of positive or negative activation and was hence discarded. We illustrate this point by contrasting self-report profiles of two films that were both developed to elicit disgust. Unexpectedly, a film depicting an employee wounded in an industrial accident (Figure 1.4, panel A) was far less successful from the standpoint of discreteness than a film depicting the surgical amputation of an arm (e.g., Figure 1.4, panel B).

In the following sections, we offer our current recommendations regarding film clips that will elicit neutral or relatively discrete emotional states. We organize these recommendations according to target emotion. One point of difference from Gross and Levenson's set of target emotions should be noted: Mild levels of contentment that were previously considered separately are now considered under Neutral. Table 1.1 presents validation data for these films across a core set of items to facilitate comparisons. In appendix 1, frame instructions are presented for creating many of these stimuli from commercially available sources. Additional film instructions, as well as copies of noncommercial films, are available at http://www.cas.usf.edu/psychology/fac_rottenbergJ.htm.

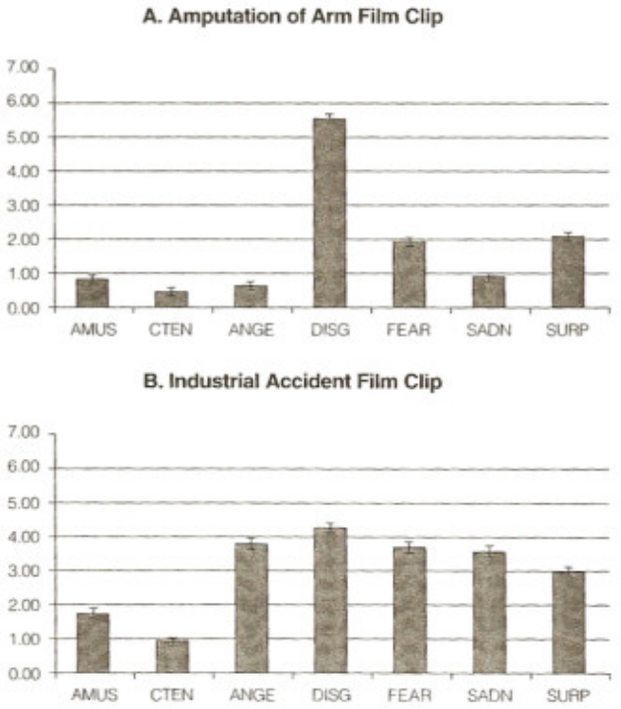

Figure 1.4. Different response profiles obtained for two films targeting disgust. Participants could report Amusement (AMUS), contentment (CTEN), Anger (ANGE), disgust (DISG), Fear (FEAR), Sadness (SADN), or Surprise (SURP).

Table 1.1
Recommended Films for Eliciting Discrete Emotional States

Target Emotion / *Film Clip*	*Sex*	*Mean (SD) Self-Reported Emotion*									
		AMUS	*ANGE*	*CFUS*	*DISG*	*EMBA*	*FEAR*	*HAPP*	*INTE*	*SADN*	*SURP*
Amusement											
Harry	M (*N* = 29)	5.45 (1.23)	0.39 (0.72)	0.55 (0.85)	0.74 (1.32)	2.55 (2.01)	0.23 (0.82)	3.39 (1.71)	4.45 (1.43)	0.13 (0.43)	1.90 (2.33)
	F (*N* = 41)	5.61 (1.28)	0.24 (0.62)	0.22 (0.53)	0.22 (0.73)	2.10 (2.07)	0.35 (0.98)	3.32 (1.82)	3.63 (1.93)	0.17 (0.67)	1.27 (1.72)
Robin	M (*N* = 28)	5.89 (1.17)	0.32 (0.67)	0.71 (1.18)	0.50 (0.92)	0.82 (1.44)	0.07 (0.26)	4.68 (1.96)	4.79 (1.34)	0.14 (0.45)	2.07 (2.12)
	F (*N* = 34)	5.82 (1.99)	0.21 (0.49)	0.70 (1.67)	0.91 (1.71)	0.53 (1.02)	0.06 (0.24)	4.59 (2.09)	4.50 (2.29)	0.18 (0.46)	1.94 (2.23)
Cosby	M (*N* = 14)	5.21 (2.36)	0.07 (0.27)	0.21 (0.58)	0.57 (1.40)	0.79 (1.53)	0.07(0.27)	3.71 (2.43)	3.64 (1.87)	0.07 (0.27)	1.14 (2.41)
	F (*N* = 24)	5.20 (1.76)	0.08 (0.27)	0.31 (0.68)	0.38 (0.90)	0.35 (0.89)	0.04(0.20)	4.23 (1.66)	4.62 (1.88)	0.04 (0.20)	1.77 (2.05)
Whose Line	M (*N* = 13)	7.23 (1.01)	0.62 (1.12)	0.54 (1.13)	1.85 (2.79)	0.92 (1.44)	0.31 (0.85)	5.92 (1.93)	6.08 (1.89)	0.08 (0.28)	3.38 (2.27)
	F (*N* = 15)	6.87 (1.19)	0.07 (0.26)	0.87 (1.46)	2.07 (2.58)	1.80 (2.91)	0.20 (0.56)	5.27 (2.60)	5.47 (2.64)	0.47 (1.81)	3.47 (2.47)
Anger											
Bodyguard	M (*N* = 27)	1.34 (1.61)	5.03 (1.82)	1.21 (1.11)	4.69 (1.61)	1.10 (1.76)	1.62 (1.57)	0.76 (1.33)	3.66 (2.02)	3.07 (2.12)	1.66 (1.97)
	F (*N* = 33)	0.61 (1.12)	5.36 (1.39)	1.82 (2.21)	4.94 (1.80)	0.61 (1.25)	2.15 (2.00)	0.42 (0.90)	3.15 (1.62)	4.21 (2.13)	1.21 (1.76)
Cry Freedom	M (*N* = 21)	0.78 (1.62)	5.87 (1.96)	3.09 (2.73)	5.74 (1.76)	1.78 (2.58)	3.00 (2.92)	0.83 (1.64)	4.09 (2.11)	5.22 (2.17)	2.86 (2.75)
	F (*N* = 36)	0.14 (0.42)	6.17 (1.68)	2.28 (2.25)	5.33 (2.48)	0.72 (1.65)	3.69 (2.41)	0.22 (0.72)	3.22 (2.26)	5.56 (1.93)	2.42 (2.56)
Disgust											
Pink Flamingos	M (*N* = 20)	2.40 (2.39)	0.95 (1.50)	1.85 (2.13)	6.60 (1.39)	0.85 (1.76)	0.45 (1.05)	0.55 (1.61)	1.20 (2.12)	0.90 (1.77)	3.05 (2.56)
	F (*N* = 31)	2.47 (2.56)	0.47 (1.22)	1.87 (2.27)	6.34 (1.54)	1.12 (2.08)	0.38 (1.13)	0.34 (0.83)	1.88 (1.86)	0.29 (1.10)	3.72 (2.43)
Amputation	M (*N* = 74)	1.23 (1.72)	0.68 (1.17)	2.22 (1.94)	5.00 (2.22)	0.51 (1.15)	1.74 (1.84)	0.27 (0.63)	2.65 (2.12)	0.93 (1.46)	2.12 (2.27)
	F (*N* = 71)	0.42 (1.20)	0.66 (1.50)	2.30 (2.43)	6.19 (1.92)	0.32 (0.88)	2.15 (2.36)	0.15 (0.73)	2.68 (2.37)	0.76 (1.56)	2.00 (2.34)
Foot Surgery	M (*N* = 11)	0.45 (0.82)	0.18 (0.41)	1.82 (2.27)	4.91 (2.30)	0.36 (0.81)	0.45 (1.04)	0.09 (0.32)	3.00 (2.57)	0.27 (0.91)	0.82 (1.94)
	F (*N* = 18)	0.56 (1.15)	0.39 (0.78)	2.00 (1.94)	4.44 (2.62)	0.39 (1.20)	1.78 (2.44)	0.17 (0.51)	2.44 (2.28)	0.28 (0.75)	1.50 (2.04)
Fear											
Shining	M (*N* = 23)	1.39 (1.37)	0.65 (1.27)	2.91 (2.26)	0.39 (0.78)	0.22 (0.42)	3.26 (2.03)	0.96 (1.22)	4.61 (1.27)	0.70 (1.26)	1.74 (2.05)
	F (*N* = 36)	0.83 (1.23)	0.17 (0.38)	1.92 (2.25)	0.00 (0.00)	0.00 (0.00)	4.61 (2.07)	0.19 (0.75)	3.89 (1.72)	0.17 (0.45)	1.08 (1.65)
Lambs	M (*N* = 31)	2.65 (2.36)	1.74 (1.53)	1.61 (1.54)	2.39 (1.96)	0.48 (0.81)	3.87 (2.46)	1.70 (1.97)	4.81 (1.52)	0.74 (1.13)	2.19 (2.04)
	F (*N* = 40)	1.07 (1.39)	0.80 (1.14)	0.88 (1.52)	1.80 (2.08)	0.28 (0.68)	4.45 (2.23)	0.60 (1.01)	4.32 (1.95)	0.53 (1.38)	1.88 (2.14)
Neutral											
Sticks	M (*N* = 19)	1.05 (1.65)	1.37 (1.71)	3.58 (2.52)	0.84 (1.26)	0.21 (0.42)	0.16 (0.38)	0.79 (1.62)	1.11 (1.56)	0.53 (1.26)	1.16 (1.68)
	F (*N* = 36)	0.83 (1.21)	0.92 (1.46)	1.92 (2.31)	0.39 (0.80)	0.14 (0.49)	0.33 (1.37)	0.75 (1.16)	0.92 (1.32)	0.11 (0.52)	0.62 (1.02)
Denali	M (*N* = 12)	2.33 (2.06)	0.00 (0.00)	0.58 (1.08)	0.00 (0.00)	0.08 (0.29)	0.25 (0.45)	3.75 (1.91)	4.54 (1.50)	0.67 (1.50)	0.42 (1.16)
	F (*N* = 12)	2.25 (2.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.29)	0.00 (0.00)	3.00 (1.91)	3.58 (2.47)	0.67 (1.23)	0.63 (1.72)

(*continued*)

Table 1.1
(continued)

Target Emotion / Film Clip	Sex	Mean (SD) Self-Reported Emotion									
		AMUS	*ANGE*	*CFUS*	*DISG*	*EMBA*	*FEAR*	*HAPP*	*INTE*	*SADN*	*SURP*
Sadness											
The Champ	M (N = 28)	0.82 (1.19)	1.75 (1.78)	1.50 (1.71)	1.07 (1.49)	0.57 (1.07)	1.14 (1.58)	0.36 (0.68)	2.86 (1.69)	5.18 (1.47)	1.18 (1.39)
	F (N = 24)	0.38 (0.71)	1.21 (1.35)	1.42 (1.72)	0.54 (0.78)	0.29 (0.86)	1.63 (2.23)	0.17 (0.48)	3.46 (2.21)	6.33 (1.31)	1.08 (1.59)
Lion King	M (N = 14)	1.79 (1.89)	2.14 (2.48)	0.64 (1.50)	0.79 (1.48)	0.29 (1.07)	1.50 (2.14)	0.29 (0.61)	4.14 (2.71)	6.79 (1.12)	0.64 (1.39)
	F (N = 15)	1.40 (2.20)	2.53 (2.29)	0.07 (0.26)	1.00 (1.93)	0.60 (1.24)	1.80 (2.68)	0.67 (1.11)	4.67 (2.23)	6.93 (1.53)	0.27 (0.59)
Return to Me	M (N = 15)	2.00 (2.04)	1.73 (2.19)	4.20 (2.70)	0.80 (1.32)	0.33 (1.05)	2.40 (2.26)	2.27 (2.79)	4.73 (2.58)	7.00 (1.20)	4.33 (2.79)
	F (N = 15)	1.40 (2.53)	2.20 (2.54)	3.07 (2.96)	0.67 (1.18)	1.27 (2.19)	2.27 (2.55)	2.47 (2.56)	6.00 (1.96)	6.93 (1.58)	3.40 (3.11)
Surprise											
Capricorn	M (N = 25)	1.12 (1.72)	0.40 (1.00)	3.64 (2.23)	0.63 (1.21)	0.20 (0.50)	2.36 (2.52)	0.56 (1.04)	3.04 (2.46)	0.52 (0.96)	5.04 (1.74)
	F (N = 37)	0.59 (1.01)	0.32 (0.82)	3.97 (2.51)	0.22 (0.53)	0.00 (0.00)	2.76 (2.36)	0.08 (0.28)	2.81 (2.03)	0.32 (0.82)	5.05 (2.24)
Sea of Love	M (N = 20)	1.60 (1.64)	0.20 (0.52)	2.15 (1.87)	0.20 (0.52)	0.15 (0.49)	2.90 (2.40)	0.70 (1.59)	2.85 (1.76)	0.20 (0.52)	3.80 (1.85)
	F (N = 34)	1.35 (1.65)	0.24 (0.89)	1.29 (1.73)	0.26 (0.90)	0.44 (1.46)	2.97 (1.96)	0.62 (1.33)	2.68 (1.82)	0.15 (0.56)	4.47 (1.97)

Column key: AMUS = Amusement, ANGE = Anger, CFUS = Confusion, DISG = Disgust, EMBA = Embarrassment, FEAR = Fear, HAPP = Happiness, INTE = Interest, SADN = Sadness, SURP = Surprise.

Row key: *Harry* = *When Harry Met Sally*: Discussion of orgasm in café (Reiner, Scheinman, Stolt, & Nicolaides, 1989); *Robin* = *Robin Williams Live*: Comedy routine (Morra, Brezner, & Gowers, 1986); *Cosby* = *Bill Cosby, Himself* Comedy routine (Cosby, 1996); *Whose Line* = *Whose Line Is It, Anyway?* Helping hands comedy routine (McCarthy, Forrest, Gowers, & de Moraes., 2001); *Bodyguard* = *My Bodyguard*: Bully scene (Devlin & Bill, 1980); *Cry Freedom* = *Cry Freedom*: Police abuse protesters (Spencer, Briley & Attenborough, 1987); *Pink Flamingos* = *Pink Flamingos*: Person eats dog faeces (Waters, 1973); *Amputation* = *Amputation*: Amputation of arm (Ekman & Friesen, 1974); *Foot Surgery* = *Leg Surgery*: Surgery on a foot (Courtesy of Paul Ekman); *Shining* = *The Shining*: Boy playing in hallway (Kubrick, 1980); *Lambs* = *Silence of the Lambs*: Basement chase scene (Saxon, Utt, Bozman, & Demme, 1991); *Sticks* = *Abstract Shapes* (ScreenPeace screen saver); *Denali* = *Alaska's Wild Denali*: Summer in Denali (Hardesty, 1997); *The Champ* = *The Champ*: Boy with dying father (Lovell & Zeffirelli, 1979); *Lion King* = *The Lion King*: Cub with dead father (Hahn, Allers, & Minkoff, 1994); *Return to Me* = *Return to Me*: Dog and man after death of wife (Tugend & Hunt, 2000); *Capricorn* = *Capricorn One*: Agents burst through door (Lazarus & Hyams, 1978); *Sea of Love* = *Sea of Love*: Man is scared by pigeon (Bregman, Stroller, & Becker, 1989).

Amusement

There are a number of film clips that reliably elicit reports of amusement and associated facial signs, such as smiling and laughing behavior. Two of the films we currently recommend were comedy segments validated in Gross and Levenson (1995). We also present validation data for two new films, *Cosby,* and *Whose Line Is It, Anyway?*

Anger

Anger is one of the more difficult emotions to elicit with film clips. Several researchers have had reported difficulty eliciting high levels of reported anger (e.g., Gross & Levenson, 1995; Philippot, 1993). Moreover, films designed to elicit anger states often turn out to elicit a blend of negative emotions, including related states such as disgust and sadness. We present data for two reasonably successful anger films, *My Bodyguard* and *Cry Freedom,* which revolve around themes of injustice. Although we welcome further efforts to develop anger films, we suspect that film procedures are at a disadvantage relative to techniques that induce anger through interpersonal situations (e.g., confederate or marital interaction), perhaps because anger requires high levels of personal engagement and/or immediacy that are difficult to achieve with a film.

Disgust

Several films reliably elicit reports of disgust and associated facial signs, such as grimacing. Two of the disgust films we currently recommend were validated in Gross and Levenson (1995). We also present validation data for one new film, *Foot Surgery,* which depicts surgical incisions made to the bottom of a patient's foot.

Fear

Fear is also a difficult emotion to elicit with film clips. As with anger, fear films tend to elicit a blend of emotions (e.g., interest, tension). Furthermore, fear stimuli that produce robust experience reports have had often disappointing effects on behavior and/or physiology (Rottenberg, Kasch, et al., 2002). Moreover, we have found that the fear films that we have piloted are accompanied by substantial gender differences on the target emotion (higher ratings for women than for men). With these caveats, we recommend two fear films.

Neutral

As we have worked with film clips over the years, we have been increasingly impressed by the heterogeneity of "neutral" as a category. We have developed two main types of neutral film clips, which might be termed *plain neutral* and *pleasant neutral.* The plain neutral type of film clip provokes very little emotion report of any kind. It is exemplified by an abstract visual display taken from a screen saver display baseline, described in Gross and Levenson (1995). This film clip has the advantage of eliciting little report of emotion. It has the disadvantage that with long (or multiple) presentations of this film clip, participants may sometimes report feeling annoyed or bored. For this reason, we have developed a second type of neutral film that is more pleasant in hedonic tone (e.g., elicits low levels of contentment). A good exemplar of a pleasant neutral film clip is *Denali,* which depicts nature scenery, animals, and uplifting music. We now favor this type of film for most purposes (e.g., our baseline) because it is well tolerated by participants, it is relaxing, and it fully engages participants' attention.

Sadness

We have also had success eliciting reports of sadness and associated facial signs, such as an upturned inner eyebrow and tearfulness. One film we currently recommend, *The Champ,* depicts a death scene. It was validated in Gross and Levenson (1995) and has been extensively used (e.g., Gross et al., 1998). We also present validation data for two new films, *Lion King* and *Return to Me.*

Surprise

Despite relatively good agreement among emotion researchers that surprise is an emotion, there has been relatively little research on surprise. One consideration in studying surprise is that it has distinct temporal properties—namely rapid onset and offset. In fact, we suspect that films that elicit reports of surprise (including the two we recommend) elicit at most only a few seconds of this emotion. Therefore, careful data extraction is a critical issue in the study of surprise.

Special-Purpose Film Stimuli

We have recommended a number of emotion film clips that we endorse as effective elicitors of relatively discrete emotional states. At the same time, we think it is critical for the field to continue to develop emotion stimuli that elicit other kinds of affective states. This is appropriate because many questions about emotion are best probed with film stimuli that are highly tailored to answer them. For example, we welcome efforts to generate stimuli that induce mixed emotional states (e.g., bittersweet; *Do You Remember Love*), broad negative states (e.g., *Hiroshima;* Butler et al., 2003), or oscillating emotional states (see Figure 1.5 for an example of an amusement-sadness-amusement sequence: *Steel Magnolias*).

The Future of Emotion Elicitation Using Film Clips

Film clips are now—and will continue to be—an important tool for eliciting emotion in the laboratory. As the scientific database concerning films expands, researchers will have many opportunities to use film clips to learn more about emotion. Here we highlight three directions that we think will shape the future use of films.

Use of Films to Study Affective Chronometry

The dynamism of films is well adapted to studying the unfolding of the emotion waveform over time as it is manifested in each emotional response system. We believe that researchers will want to capitalize on films' dynamic quality to develop the emerging theme of affective chronometry (Davidson, 1998). That is, in addition to studies that focus on the overall magnitude of emotional responses, researchers will use films to conduct studies to clarify aspects related to emotion's latency, rise time, duration, and offset (e.g., Hemenover, 2003; Rottenberg, Wilhelm, Gross, & Gotlib, 2003).

Use of Films to Study Emotional Coherence

In addition to clarifying how emotion unfolds over time, researchers may wish to use films to clarify the *organization* of emotional responses. One major postulate of many contemporary theories of emotion is that emotion imposes coherence across multiple response systems (e.g., experiential, behavioral, and physiological). Surprisingly, few studies have tested this core hypothesis, and those that have done so have yielded mixed results. In Figure 1.5, we display data from a recent study of 60 women who viewed a 5-minute film clip constructed from segments drawn from *Steel Magnolias*. Segments were sequenced so as to target amusement, then sadness, then amusement. Throughout the film viewing period, continuous measures of emotion experience, expression, and physiology were obtained in order to examine the conditions under which response coherence is evident (Mauss, Levenson, McCarter, & Gross, 2005). As is evident from Figure 1.5, behavioral, experiential, and physiological responding were all correlated during film viewings, but the correlations between behavioral and experiential response systems were higher than the correlations between either of these and physiological responding. In future work, it will be important to employ films to study emotion coherence in other samples varying in age and mental health.

Use of Related Dynamic Presentation Technologies

We continue to be excited by the emergence of related dynamic presentation technologies that will expand the repertoire of emotional stimuli that can be presented to participants. Perhaps most notable is the emergence of interactive presentation technologies such as virtual reality, which allow a participant to interact with objects and other individuals within a simulated environment that is presented in 3-dimensional computer graphics (Loomis, Blascovich, & Beall, 1999). Furthermore, these interactive technologies will be reinforced by the development of Internet-based display and rating procedures that will allow researchers to collect larger amounts of emotion data. The use of interactive technologies will allow exploration of many aspects of emotion that are difficult to probe with an emotion film (e.g., the effects of emotion on mutual gaze). At the same time, precisely because of films' highly standardized and noninteractive quality, we are confident that films will continue to have an abiding utility in the field, even as novel emotion elicitation techniques are refined.

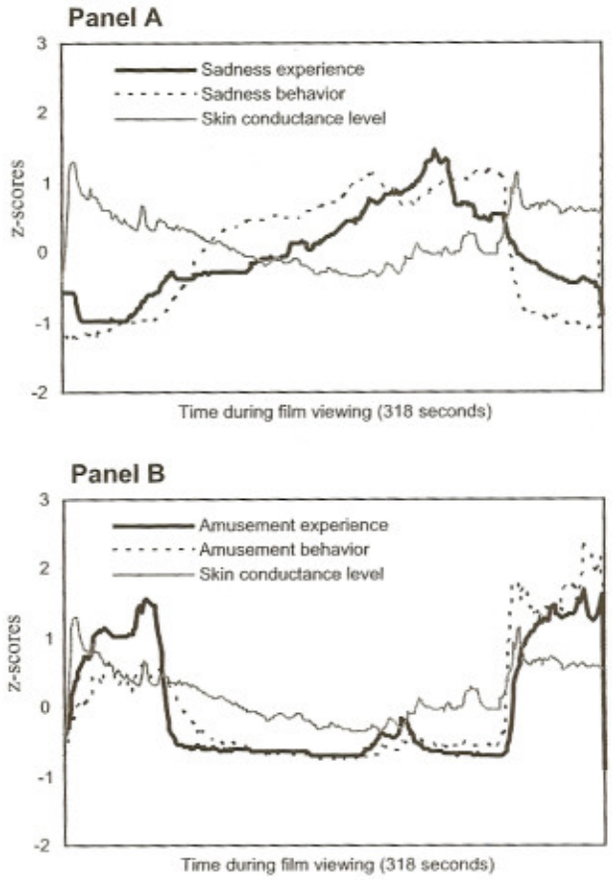

Figure 1.5. Coherence between emotion response systems during an amusing-sad-amusing film sequence.

Appendix: VHS and DVD Instructions for Creating Emotion Films

This appendix contains information about creating 12 of our recommended films. Most of these stimuli were developed from full-length commercial films, all of which are currently available in videotape or DVD format. For these commercial films, we have provided detailed frame editing instructions for creating the same excerpt that we evaluated in this chapter. For those of you who have editing equipment, we have provided precise timing information in terms of hours, minutes, seconds, and frames. If you have a conventional VCR that tracks time in hours, minutes, and seconds, you can use the counter on your VCR to locate the excerpts to the nearest second, and, if possible, you can use the pause mode and frame advance to locate the exact frame (there are 30 frames per second in VHS [NTSC] format). In recognition that our field is becoming more digital

and computer based, we have also included frame editing instructions (in parentheses) for films that are currently available in DVD format. If your equipment does not have this kind of timing capability, you will need to use a stop watch. In any event, we recommend that you follow our editing instructions as closely as possible, because relatively small editing variations can produce somewhat different emotional reports.

Some of the film stimuli are derived from noncommercial sources. These are available for download as noted.

Amusement Films

Harry

Film: *When Harry Met Sally*
Target emotion: Amusement
Clip length: 2'35"

Instructions: Advance to the first frame, in which an elderly couple is visible (the first scene after the opening credits). Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 00:42:39:29 (00:44:49:17). At this point, a man and a woman are sitting in a restaurant. The clip begins five frames after the camera angle switches from a view of the man and woman at the table to a view (over the man's shoulder) of the woman fixing the sandwich on her plate and saying "You know, I'm so glad I never got involved with you. . . ." End the clip at 00:45:15:12 (00:47:25:07). At this point, an older woman who is ordering her meal has just said "I'll have what she's having."

Robin

Film: *Robin Williams Live*
Target emotion: Amusement
Clip length: 7'59"

Instructions: Advance approximately 2 minutes into the film, to the point at which the comedian first comes onto the stage. When the camera switches from a view of the audience (a woman is descending the stairs to her seat) to the first frame of a close-up of the comedian's torso and head, reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 00:03:13:01. At this point, the camera has just moved from a back view of the comedian to a front view of him as he looks down at his cup of water. End the clip at 00:11:11:10. At this point, the comedian has just said, "you're still there!" and the camera has gone to an upper-balcony view of the theater. End the clip 73 frames after the camera has gone to the upper balcony.

Robin Short (Short version of validated film clip)

Film: *Robin Williams Live*
Target emotion: Amusement
Clip length 3'25"

Instructions: Advance approximately 2 minutes into the film, to the point at which the comedian first comes onto the stage. When the camera switches from a view of the audience (a woman is descending the stairs to her seat) to the first frame of a close-up of the comedian's torso and head, reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 00:06:41:01. At this point the comedian is holding a cup of water and stepping off the step with his right foot, saying "I'm fine now. . . ." Stop recording at 00:08:00:01. At this point, the comedian has just talked about a dog who says, "I've just learned to lick my own genitals, leave me alone! Don't do this to me!" The camera has switched to a faraway shot from the upper balcony. Stop recording at this point, 26 frames into the shot from the upper balcony, just before the comedian says, "And your dog. . . ." Begin recording at 00:08:51:12. At this point, the comedian has his mouth open, his head slightly back, and his left hand open. Begin recording 17 frames before the comedian closes his hand, just before he says, "And you're inside stoned going, 'Oh God help me now!'" End the clip at 00:10:56:19. At this point, the comedian has just said, "his face turns into a cheeseburger, you lunge!" and lowered his arms and looked slightly off to his left.

Anger Films

Bodyguard

Film: *My Bodyguard*
Target emotion: Anger
Clip length: 4'06"

Instructions: Advance to the first frame in which a growing circular form has the words "Magnetic Video" written under it in full. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 01:12:23:05 (01:12:15:01). At this point, two men are visible, one wearing a red tank top and the other wearing an army jacket. A fight is about to begin. Several people are in the background, including a blond-haired boy in the lower right-hand corner of the screen. Begin the clip at the first frame in which the blond-haired boy's hand covers both his mouth and nose. End the clip at 01:16:29:27 (01:16:20:20). At this point, a man dressed in a gray muscle shirt and black pants is exiting the scene, with trees, a wall, and a fence in the background. This comes two frames before a shot of a man with a bloody nose on all fours.

Cry Freedom

Film: *Cry Freedom*
Target emotion: Anger
Clip length: 2'36"

Instructions: Advance to the point at which "Cry Freedom" is typed across the screen. At the first frame in which the "m" is visible, reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 2:24:56:11 (02:25:56:07). At this point, there is a shift from a view of protesters in the distance to a close-up of a bald girl with a pink skirt and a

boy crossing just in front of her. Begin the clip with the first frame of this close-up. Stop recording at 2:25:16:07 (02:26:15:05). At this point, a boy in a dark gray sweater is jumping up and down. Stop recording at the last frame in which he is visible before the camera shifts to the two groups of protesters joining into one group. Begin recording at 2:25:32:06 (02:26:32:06). This is the point at which the camera switches to a view of the three groups of protesters who have just joined into one big group that is advancing straight toward the camera. End the clip at 2:27:49:10 (02:28:49:10). At this point, a man in a car has just shot a boy who was running away. Stop recording after the boy falls, at the first frame in which he is completely still.

Disgust Films

Pink Flamingos

Film: *Pink Flamingos*
Target emotion: Disgust
Clip length: 0'30"

Instructions: Advance to the first frame in which the words "Dreamland Studios" are visible with a mobile home behind them. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 1:31:08:08 (1:31:28:11). At this point, three people have just seen a woman walking her dog. They begin to smile and lick their lips. The dog lowers its head towards the ground slightly. Begin recording 2 seconds and 22 frames (82 frames) after the camera switches from a close-up of the woman to the dog defecating. End the clip at 1:31:38:08 (1:31:58:11). At this point, the woman has her teeth together in a smile after having stuck her tongue out. (This is a little more than a second before "The end" appears.)

Amputation

Film: Noncommercial surgery film
Target emotion: Disgust
Clip length: 1'02"

Film available for download at http://www.cas.usf.edu/psychology/fac_rottenbergJ.htm

Fear Films

Shining

Film: *The Shining*
Target emotion: Fear
Clip length: 1'22"

Instructions: Advance to the first frame of the film, which shows a body of water surrounded by mountains. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 00:56:51:15 (00:57:03:08). At this point, a boy's hands are visible (one flat on the floor and the other in a fist). There are toy trucks and cars on a red, brown, and orange carpet. End the clip at 00:58:12:18 (00:58:24:01). At this point, an open door with a key in the lock is visible, and one full second has passed since the boy has said "Mom, are you in there?"

Lambs

Film: *Silence of the Lambs*
Target emotion: Fear
Clip length: 3'29"

Instructions: Advance to the first frame of the film in which the words "A STRONG HEART DEMME PRODUCTION" appear. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 01:40:16:29 (01:40:56:01). At this point, a dirt road and trees are in the forefront and a mint green trailer is in the background. Stop recording at 01:43:44:23 (01:44:24:10). At this point, the profile of a dark-haired woman is visible. There is a metal wire hanging from the ceiling that appears to almost (but not quite) touch her nose and chin. Begin recording at 01:46:36:24 (01:47:16:01). At this point, hands holding a gun are moving rapidly into the scene from the right of the screen. In the background, there is dirty yellow wallpaper. End the clip at 01:46:38:19 (01:47:18:01). At this point, the dark-haired woman has her back to the yellow wallpaper and has pointed her gun between the upper middle and the upper right-hand portions of the screen. Her right hand obscures most of the left half of her face and we hear her exclaim as the lights go out.

Neutral Films

Sticks

Film: Noncommercial screen saver
Target emotion: Neutral
Clip length: 3'26"

Instructions: Film available for download at http://www.cas.usf.edu/psychology/fac_rottenbergJ.htm

Denali

Film: "Alaska's Wild Denali"
Target emotion: Neutral
Clip length: 5'02"

Instructions: Reset the timer to 00.00.00:00 when the credits for the Alaskan production company come up. Begin the clip at 00:33:28:00 (00:33:15:00), right after a person plays a guitar. Start as the music is still playing and fading and the visual is a silhouette of a mountain and the midnight sky; the narrator talks about the Alaskan midnight sky. End the clip at 00:38:30:00 (00:38:17:00). At this point, a buck is eating little grasses, and there is a shot of a mountain stream.

Sadness Films

The Champ

Film: *The Champ*
Target emotion: Sadness
Clip length: 2'51"

Instructions: Advance past the title, "Metro-Goldwyn-Mayer Presents," to the first frame in which the title is no longer visible. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 01:50:29:02 (01:54:23:01). At this point, a boxer is lying on a table in a locker room. The boxer says "Where's my boy?" Another man answers, "He's right here." Begin recording as a blond-haired boy walks out of a darkly lit area, just before you hear the boxer ask "Where's my boy?" for the last time. Stop recording at 01:50: 52:05 (01:54:45:20). At this point, the boxer says "TJ," and then says "Annie was here tonight, TJ." Stop recording after he says "TJ" and before he says "Annie was here tonight, TJ." Begin recording at 01:51:56:14 (01:55:54:01). Begin recording immediately before the child says "Yeah. . . . The champ always comes through. . . ." Stop recording at 01:52:26:04 (01:56:18:20). At this point, the boxer has just closed his eyes and died. Begin recording at 01:53:15:21 (01:57:13:15). At this point, we see a side view of the dead boxer lying on the table. The camera then goes to the boy who is standing in front of a tall man. Only the man's torso is visible. He is wearing a towel around his neck and is holding the boy's shoulders. The boy is crying and saying, "Champ." End the clip at 01:55:11:03 (01:59:08:20). At this point, the boy is crying, saying "I want Champ." The man replies, "Please, TJ, listen to me. He's gone. He's gone, son. He's gone." The child, still crying, replies, "No. No. He's not gone, he's not, he's not." Stop recording at the frame in which the boy backs away from the man.

Surprise Films

Capricorn

Film: *Capricorn One*
Target emotion: Surprise
Clip length: 0'49"

Instructions: Advance to the first frame in which the words "Sir Lew Grade Presents" are visible. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 01:32:58:18 (01:33:07:06). At this point, a man is sitting on a bed in an apartment. Begin recording at the first frame after the camera switches from a close-up of the man's face to a shot from down the hall. End the clip at 01:33:47:27 (01:33:56:17). At this point, men have just burst through the door. Stop recording at the frame after the third agent has left the screen (from left to right) and the man can be seen on the bed.

Sea of Love

Film: *Sea of Love*
Target emotion: Surprise
Clip length: 0'9"

Instructions: Advance to the first frame in which the words "A Martin Bregman Production" are visible. Reset the timer to 00:00:00:00 (hours:minutes:seconds:frames). Begin the clip at 01:19:05:15 (1:19:26:01). At this point, a man has gotten out of an elevator and begun walking down the hall toward an exit door. Begin recording as he turns the corner, at the frame in which he first turns his back completely to the wall and is looking toward the left. End the clip at 01:19:16:00 (1:19:35:03). At this point, the last bird has just flown out of view.

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