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A Cross-Cultural Perspective on Disgust

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Introduction

Observation, theory, and empirical support have led to the proposition that several innate, universal emotions exist (Darwin 1872/1965; Ekman, 1992, 1999; Izard, 1991, 1992; Tomkins & McCarter, 1964). These universal emotions, often referred to as basic emotions, are discrete, accompanied by a unique set of characteristics, and have evolved for their evolutionary relevant adaptive value (Abe & Izard, 1999; Ekman, 1999). Basic emotions are believed to be accompanied by a unique signal, physiological response, automatic appraisal mechanism, and theme of antecedent events (Ekman, 1992, 1999). In addition, basic emotions are likely to have distinctive developmental appearances, be present in other primates, occur quickly, have a brief duration, occur effortlessly, and be related to distinctive thoughts, memories, and subjective experiences (Ekman, 1992, 1999). Proponents of the universal theories of emotion suggest that individuals are born hard-wired to experience the basic emotions (Ekman, Levenson, & Friesen, 1983; Tomkins & McCarter, 1964). While the emotions are expected to be similar across individuals, some of the emotion components are believed to be susceptible to influence by the environment and experiences of the individual (Abe & Izard, 1999). The facial expressions associated with the various emotions are typically expected to be consistent, but it is suggested that culture influences the evoking stimuli, linked affects, display rules, and behavioral consequences (Ekman, 1994; Ekman, Sorenson, & Friesen, 1969).

Traditional lists of basic emotions include disgust, anger, fear, surprise, happiness, and sadness (Ekman & Friesen, 1971; Ekman & Friesen, 1986; Ekman et al., 1983; Ekman et al., 1969). Contempt was later proposed as another basic emotion after the contempt facial expression was correctly identified the majority of the time across ten culturally diverse samples (i.e., Estonia, Germany, Greece, Hong Kong, Italy, Japan, Scotland, Turkey, the US, and West

Sumatra) (Ekman & Friesen, 1986). Later research examining contempt as an emotion with a universal expression has yielded equivocal results. Additional support for the universality of contempt has been reported by some studies (Ekman & Heider, 1988; Matsumoto, 1992b), while others have reported low rates of correctly identifying contempt expressions (Alvarado & Jameson, 1996; Biehl et al., 1997; Russell, 1991a; Wagner, 2000). The above-mentioned list of basic emotions is not meant to be definitive and additional emotions have been examined as possible universal emotions, including awe, embarrassment, excitement, guilt, interest, and shame (Ekman, 1992).

Empirical studies have tested the universality hypothesis by examining the reactions of members of different cultures, infants, and animals to similar contexts that may evoke the basic emotions, and there is some evidence that some degree of universality of emotions exists (Ekman, 1992, 1994). While there is a consensus that there are some similarities in emotional experience across culture, theories differ on the proposed importance of the influence of culture on the experience and/or expression of emotion (Russell, 1995). Universality research has been accused of using methods that enhance the similarities between cultures and ignoring alternative explanations of findings. For example, Russell (1994) suggested that the previous results are consistent with several interpretations, including initial interpretation of the expressions into culture specific categories that are later paired with the most similar provided emotion, bipolar dimensions of expressions, situation specific responses, and instrumental actions, in addition to the universality explanation.

The Case of Disgust

Despite the fact that disgust has consistently been listed as one of the universal emotions, it has received relatively little research attention (Olatunji & Sawchuk, 2005). Although disgust

has traditionally be referred to as the forgotten emotion (Phillips, Senior, Fahy, & David, 1998), the contemporary consensus is that disgust has finally arrived (McNally, 2002) with researchers increasingly more interested in the long-lasting effects of disgust on behaviors, preferences, and even mental health. Studies have also examined cross-cultural manifestations of disgust with knowledge about differences and similarities in diverse cultures informing our understanding of the idiosyncrasies of disgust.

Disgust as a basic emotion

Research and theory have focused on identifying the signal, physiological response, theme of antecedent events, and function unique to disgust to support its classification as a basic emotion. Disgust was originally conceptualized as a protective mechanism designed to prevent the oral ingestion of inappropriate objects (Darwin, 1872/1965). The original function of disgust, to aid in disease avoidance and food selection, is most consistent with what is currently termed core disgust. Core disgust elicitors are items that could be ingested and are potentially harmful, such as certain types of food, animals, and body products (Rozin, Haidt, McCauley, 2000; Haidt, Rozin, McCauley, & Imada, 1997). Rozin and colleagues (2000) suggest that the original oral rejection function of disgust has since been accompanied by a denial of mortality and a protection of the body, soul, and social order (Rozin et al., 2000). Current conceptualizations of disgust have added three additional categories of disgust elicitors: animal-nature (i.e., sex, death, hygiene, envelope violations) interpersonal (i.e., direct or non-direct contact with strangers or undesirables), and moral (i.e., moral offenses) (Rozin et al., 2000).

The Face of Disgust

Consistent with the original function of disgust, to avoid ingestion of inappropriate objects, signals associated with disgust focus on the face, and more specifically the mouth. Early

conceptualizations of the disgust facial expression differed somewhat in their emphasis. Darwin's (1872/1965) initial description of the facial expression of disgust emphasized the gape (i.e., mouth held open widely), but also mentioned a raised upper lip and a nose wrinkle. Izard's (1971) description of the portrayal of disgust included a raised upper lip, the mouth corners drawn and back, and the tongue moved forward and may be slightly protruding. As depicted in Figure 1, Ekman and Friesen's (1975) description of the disgust expression consists of a lip retraction, a raised lower lip, and a wrinkled nose. This facial expression often signals the experience of nausea, increased salivation and parasympathetic responding and functions to protect the body form the ingestion of an object (Levenson, 1992; Levenson, Ekman, & Friesen, 1990; Rozin et al., 2000). However, the description of the expression of disgust is largely based on findings of studies conducted in Western countries. If disgust is a universal emotion, similar characteristics should be associated with the expression and experience of disgust across cultures.

Cross-Cultural Studies on Disgust

Facial recognition of emotion

The most common method used for testing the universality theory is to ask participants from different cultures to match emotional facial expressions with emotion labels (Ekman et al., 1969). This standard facial expression identification task pre-selects photographs depicting the basic emotions. For example,photographs are often of posed expressions, in which the individual was either asked to display a specific emotion or instructed to present facial muscles in a specific manner. The facial expressions are then briefly presented to a participant and he or she is asked to select the emotional label that is consistent with the facial expression from a list of other emotional labels (Ekman et al., 1969). The percentage of correct responses is then

compared to base-rate, chance percentages, and/or across groups. Facial expression recognition tasks have been conducted using a variety of samples including Western, Non-Western, and preliterate cultures. The most common approach to the cross-cultural examination of emotions is to obtain participants in at least one Western and one Non-Western sample and compare the responses and accuracy rates on the recognition task. Findings of similar high rates of accuracy of the identification of the disgust expression on these recognition tasks would provide support for the universal experience of disgust.

Accuracy

The basic facial expression recognition task assesses the accuracy with which various samples label the facial expression with the targeted emotion chosen from a list of emotions. This basic form of the recognition task has been administered to participants from a large number of samples. As would be expected, based on the fact that the majority of the studies have been conducted by American researchers and used photographs of American individuals displaying the facial expression, participants from the US have consistently succeeded at identifying disgust with accuracy ranging from 60 (on one expression) to 96 percent (Biehl et al., 1997; Ekman et al., 1987; Ekman et al., 1969; Haidt & Keltner, 1999; Matsumoto, 1992a; Matsumoto & Ekman, 1989). Japan is the second most frequent sample to be included in facial expression recognition studies. Japanese participants generally produced lower accuracy rates than US participants, with correct identification ranging from 30 to 82 percent (Biehl et al., 1997; Ekman et al., 1987; Ekman et al., 1969; Izard, 1971; Matsumoto, 1992a; Matsumoto & Ekman, 1989; Yik & Russell, 1999).

The percentage of accurate identification for the disgust expression across all non-US samples ranges from 29 (New Guinea Pidgin) to 98 percent (Malaysia) (Biehl et al., 1997;

Ekman et al., 1987; Ekman et al., 1969: Haidt & Keltner, 1999). The reported accuracy rates for recognition studies that have included disgust are depicted in Table 1. Several patterns emerge when examining accuracy rates across samples. First, the majority of the samples achieved accuracy rates above fifty percent. The only groups to yield scores below 50 percent were New Guinea Fore and Pidgin and Japan in one study (accuracy rates were above 50 in the other six studies including Japanese samples). Some variation appeared in the samples that scored above 50 percent. The United States, most European countries, and the South American countries typically received accuracy ratings above 75 percent. Canada and Germany produced lower accuracy scores than their neighboring countries and did not produce accuracy scores above 75 percent. The samples from Asia and Africa tended to fall in the 50 – 75 percent accuracy range. In sum, these findings suggest that the Western and South American cultures tended to be more accurate in their identification of the disgust expression than non-Western cultures. As the majority of the studies used Western posers and language (as the original word), this may suggest that culture and/or language may have some influence on the recognition of facial expressions.

Isolated cultures

While the majority of the facial expression recognition studies have used participants from either Western or Western-influenced cultures, some research has been done using participants from isolated cultures. Ekman and Friesen (1971) recruited participants from the Fore linguistic cultural group of New Guinea. Participants with both minimal and some contact with Western culture were recruited and selected for participation. Participants were read a brief story designed to depict a particular emotion and then asked to pick the appropriate reaction from photographs depicting facial expressions associated with various emotions. While New Guinea

participants yielded low accuracy scores on the traditional facial recognition task in a previous study (Ekman et al., 1969), the accuracy ratings were much higher with this modified method. The disgust facial expression was identified the majority of the time and significantly more often than the other facial expressions presented in both disgust stories by both adults ("smell story" 77% correct, "dislike story" 89% correct) and children ("smell story" 95% correct, "dislike story" 78% correct) (Ekman & Friesen, 1971). There were no significant differences in accuracy between the more Western influenced and the less Western influenced groups. In a similar study, Ekman (1971) had participants from New Guinea's Fore and Dani groups complete the emotion story task described above. The disgust expression was the most frequent expression associated with the disgust story by both groups (Fore 85% accuracy, Dani 91% accuracy). The findings that the accuracy rates for members of isolated cultures were similar to past findings using college students from Western or Western influenced cultures was interpreted as support for the notion that disgust is a universal emotion with a clearly identifiable facial expression.

In addition to examining the accuracy of the recognition of the disgust expression, the production of the disgust expression has also been tested with members of isolated cultures. Ekman (1971) conducted an emotion expression production study using members of the New Guinea Fore culture that did not participate in the recognition task. Participants were read the emotion stories used in the recognition task and asked to make the facial expression that would appear if they were in that situation. US college students were later asked to identify the emotion depicted in the Fore facial expressions. The Fore disgust expressions were accurately identified 46 percent of the time by the US participants (Ekman, 1971). This was considered an accurate judgment of the disgust expression and interpreted as further support for the universality of the disgust expression.

Free-response

One criticism of the standard emotion recognition task is its use of forced-choice response options, and it has been suggested that this method exaggerates the similarity of emotions between cultures (Russell, 1994). Two studies that compared free responses provided by participants from America to those from India reported disgust as the most frequent response provided for the disgust expression (Haidt & Keltner, 1999; Hejmadi, Davidson, & Rozin, 2000). Moreover, while some of the percentages were lower than what is typically reported using the forced-choice method, all samples identified disgust at a rate above 50% (Haidt & Keltner, 1999; Hejmadi et al., 2000). A third study that allowed participants to provide their own response recruited participants from Canada, Greece, and Japan (Russell, Suzuki, & Ishida, 1993). Disgust was the modal response to the disgust expression and was provided by 50% or greater of the participants in all three samples (Russell et al., 1993). Table 1 depicts the percentage of participants that provide disgust as the correct response for the disgust expression in the free-response studies. These studies suggest that while the percentage of correct identification may be lower using free-response methods compared to fixed-choice methods, participants still accurately identify the disgust emotion the majority of the time.

Additional Emotions

The standard facial recognition task has also been criticized for instructing participants to choose only one of a list of emotions, which could give the illusion that emotions are more discrete and the cultures are more similar than they are in reality (Russell, 1994). Two studies have varied the standard emotion recognition task to allow participants to list multiple emotions as being portrayed in the emotion expression. In both of the studies, the disgust label was the

most frequently listed emotion for the disgust expression (Ekman et al., 1987; Yrizarry, Matsumoto, & Wilson-Cohn, 1998). However, analyses done by Yrizarry and colleagues (1998) revealed that the amount of variance accounted for by the disgust response predicting the disgust photograph in their study was 44% in the American sample and 15% in the Japanese sample. Both studies indicated that contempt was listed as a secondary emotion to disgust (Ekman et al., 1987; Yrizarry et al.), and one reported anger as an emotion frequently listed along with disgust (Yrizarry et al., 1998). Yrizarry and colleagues (1998) concluded that the finding of additional non-target emotions does not contradict the universality thesis as long as the target emotion was rated as most salient.

Social Message

Facial expressions of emotion also function to convey information to others (Fridlund, 1994). In addition to the standard selection of the appropriate emotion, Yik and Russell (1999) asked Canadian, Cantonese-speaking Chinese and Japanese participants to identify the social message conveyed by photographs of facial expressions. The disgust emotion was correctly identified at a rate higher than base rate in all three cultures. While disgust was the highest endorsed emotion statement ("I'm feeling disgusted") for the disgust expression in the Canadian and Chinese samples, anger ("I'm really mad") was the highest endorsed emotion statement for the disgust expression by the Japanese sample (Yik & Russell, 1999). The disgust-relevant social message ("That stinks!") was the highest endorsed social message for the disgust expression in all three samples (Yik & Russell, 1999).

The association between disgust, anger, and contempt found in the studies conducted by Yrizarry and colleagues (1998) and Yik and Russell (1999) can be explained by the CAD triad hypothesis, which suggests that contempt, anger, and disgust (CAD) are critical and related

moral emotions (Rozin, Lowry, Imada, & Haidt, 1999) that are elicited by specific socio-cultural norm violations. The violations are classified into one of three ethics used by various cultures: community (communal codes, including hierarchy), autonomy (individual rights), and divinity (purity-sanctity) (Shweder, Much, Mahaptra, & Park, 1997). Contempt is proposed to be related to community violations, anger to autonomy violations, and disgust to divinity violations. Rozin and colleagues examined the cross-cultural validity of the CAD hypothesis by recruiting participants from the US and Japan to participate in a series of studies. Participants in both samples assigned the hypothesized emotion label and facial expression to the corresponding violation the majority of the time. When asked to produce a facial expression appropriate to a situation, US participants (Japanese participants were not included in this study) produced facial expressions consistent with the emotion proposed to be evoked by each situation. According to the CAD triad hypotheses, the emotions of contempt, anger, and disgust may cluster together in a functional manner to maintain social order across cultures.

Alternative methods

Extending beyond the labeling of emotion methodology, two cross-cultural studies have used the relived emotion task to examine cross-cultural manifestations of disgust. The relived emotion task examines the production of facial expressions in participants when remembering situations in which they experienced specific emotions (Hmong Americans vs. European Americans, Tsai & Chentsova-Dutton, 2003; Scandinavian Americans vs. Irish Americans, Tsai, Chentsova-Dutton, Bebeau, & Przymus, 2002). The facial muscles AU4, AU9, and AU10 (using the FACS, Ekman & Friesen, 1978) were found to be more associated with disgust than other emotions in all cultural groups (Tsai & Chentsova-Dutton, 2003; Tsai et al., 2002).

In an attempt to assess the natural expression of emotion, Ekman (1971) videotaped American and Japanese participants as they watched neutral and stress inducing film clips. The researchers observed the facial expressions displayed by the participants while watching the film clips and recorded the frequency of the emotion expressions displayed. Both Japanese and American participants displayed disgust reactions while viewing the stress-inducing clip (the frequency of disgust expressions was 48 and 61, respectively). The author noted that disgust was the expression that differed in frequency the most between the neutral and stressful clips. These findings suggest that disgust is a natural response to negative stimuli in both the US and Japan.

Another variation on the standard facial emotion expression recognition task used expressions displayed in dance from classic Hindu texts that provide a theory of emotion and a detailed account of how classic emotions should be expressed (Hejmadi et al., 2000). The photographs in the recognition task place an emphasis on the hands in addition to the face. American and Indian participants were assigned to either the free-response or fixed response condition and three disgust portrayals were presented in each condition. Disgust was the most common response to the disgust emotion portrayals in all pictures and conditions. Percentage of correct recognition ranged from 60 – 96 in the fixed response condition and from 65 – 83 in the free response condition (Hejmadi et al., 2000). The study provided support for the universality of disgust while using stimuli derived from a non-Western culture.

Intensity

Examination of the universal nature of disgust requires examining dimensions beyond simple recognition tasks of emotion. Several studies have looked at estimates of the intensity of expressions across cultures. Results across studies have not consistently supported differences or lack of differences between cultures in the perceived intensity of disgust facial expressions. Two

studies have compared intensity ratings between Japanese and American participants. While Matsumoto and Ekman (1989) did not find any significant differences in intensity ratings, Matsumoto, Kasri, and Kooken (1999) found differences between American and Japanese participants in both the perceived expression and the experience of disgust. The authors suggested that participants may differentiate between the perceived intensity of the external display of the expression (i.e., the intensity of the other person's portrayal of the emotion) and the intensity of the experience at the time the expression is being displayed (i.e., the intensity of the person's internal experience when displaying the emotion). While the American participants rated the expression as more intense than the Japanese participants, the Japanese participants rated the experience as more intense than the American participants (Matsumoto et al., 1999). Within group examination of the relation between experience and expression revealed that American participants rated the expression as more intense than the experience, while the Japanese rated expression and intensity as equally intense.

Several studies examined perceived intensity in American participants with various cultural identifications. Matsumoto (1993) found that American participants that identified themselves as black rated photographs of facial expressions of disgust as more intense than participants that identified themselves as Caucasian or Asian. Tsai and colleagues (2002) found no differences in displayed or perceived intensity during relieved emotion tasks between Hmong Americans and European Americans. Similarly, Tsai and Chentsova-Dutton (2003) reported no significant differences in the displayed intensity of the disgust expression between American participants with Scandinavian and Irish ancestors.

Two studies have examined perceived intensity using a larger number of culturally diverse samples. Biehl and colleagues (1997) examined participants from six countries: Hungary,

Japan, Poland, Sumatra, the United States, and Vietnam, which they later classified as Western (U.S., Poland, and Hungary) and Non-Western (Japan, Vietnam, and Sumatra) for analyses. Results indicated that the Western countries rated half (four out of eight) of the disgust photographs as more intense than the Non-Western countries, but there were no significant differences in the intensity ratings of the other disgust photographs (Biehl et al., 1997). In one of the more comprehensive cross-cultural studies of emotion to date, Ekman and colleagues (1987) recruited participants from ten countries: Estonia, Germany, Greece, Hong Kong, Italy, Japan, Scotland, Sumatra, Turkey, and the US. The perceived intensity ratings obtained revealed significant differences between countries on perceived intensity, but failed to find a pattern underlying the differences (Ekman et al., 1987). While cross-cultural studies examining differences in perceived emotion have not consistently indicated differences in perceived emotion between cultures, the studies that have found differences suggest that culture is likely to have an influence on the intensity of perception, and possibly experience of the emotion.

Physiology

The universality hypotheses would predict that the physiological characteristics of disgust should be similar across cultures. However, cross-cultural comparisons of the physiological responses of disgust are rare. Two studies examining physiological patterns between specific cultures when reliving disgust experiences report no differences in skin conductance levels (Hmong Americans vs. European Americans, Tsai & Chentsova-Dutton, 2003; Scandinavian Americans vs. Irish Americans, Tsai et al., 2002).

In a more comprehensive assessment of physiology, Levenson, Ekman, Heider, and Friesen (1992) recruited males from the Minangkabau culture of West Sumatra to participate in a directed facial action task. The Minangkabau culture is a matrilineal, Muslim, agrarian culture

with strong beliefs about the inappropriateness of public displays of negative emotion. Findings in Minangkabau culture were compared to previous findings obtained in the US. In order to create the disgust facial expression, participants were instructed to wrinkle their noses while opening the mouth, pull the lower lip down, and move the tongue forward without sticking it out (Levenson et al.). Overall, the disgust configuration was associated with less heart rate acceleration, less finger pulse transmission time, less finger pulse amplitude (actually showing a decrease in amplitude), a shortening of respiratory period, and less deepening of respiration. Disgust displayed significantly less heart rate acceleration than anger, fear, and sadness (with happiness in between). Disgust and happiness showed significantly greater shortening of finger pulse transmission time than sadness (with anger and fear in between). Disgust and fear were associated with significantly more shortening of respiratory period than happiness (with anger and sadness in between). Finally, disgust was associated with significantly less respiratory depth than happiness (with the other emotions in between). The culture X emotion interaction was non-significant for all of the physiological measures except for respiratory depth, suggesting that the differences between emotions were not different across the cultures. While the Minangkabau participants displayed facial configurations of a lower quality than American participants on most emotions, the two samples did not display significantly different levels of quality of the disgust configuration. However, the Minangkabau participants rated the creation of the facial configuration as more difficult than the American participants and were less likely to report experiencing disgust while maintaining the facial configuration.

Elicitors of Disgust

One characteristic of disgust that has been theorized as likely influenced by culture is the common elicitor of the emotion (Ekman, 1994). The standard method of assessing elicitors of

disgust is to ask the participants to list stimuli that evoke the emotion. However, studies have varied on how they have classified and reported the participants' responses. Some researchers have reported general themes of responses. Results suggest that Hmong Americans, European Americans, Scandinavian Americans, and Irish Americans typically listed events that revolved around another's person's actions as elicitors of disgust (Tsai & Chentsova-Dutton, 2003; Tsai et al., 2002). The Hmong American and European American samples also frequently listed non-human organisms or objects as elicitors of disgust (Tsai et al., 2002).

Curtis and Biran (2001) examined disgust elicitors provided by participants in previous studies. The samples included participants that were recruited from India, Burkina Faso, the Netherlands, the United Kingdom, and an international airport (sample included individuals from Europe, Greece, the US, the Middle East, and Africa). As shown in Table 2, there were many similarities in disgust elicitors provided across samples. For example, feces appear to be salient disgust stimuli for humans across cultures. After reviewing the participants responses, the authors provided five categories of disgust elicitors that best captured the cross-cultural data: 1) bodily excretions and body parts, 2) decay and spoiled food, 3) particular living creatures, 4) certain categories of "other people", and 5) violations of moral or social norms (Curtis & Biran, 2001). The authors concluded that the provided elicitors supported a disease avoidance model of disgust and provided examples of pathogens related to each of the common elicitors (e.g., feces are related to infectious intestinal diseases caused by pathogens such as Salmonella).

Other studies have classified the disgust elicitors using pre-selected, theoretically derived dimensions. Haidt and Keltner (1999) examined participants' responses at both a general and specific level. At the general level, the provided situations were classified into one of five domains: other-critical, self-conscious, negative, positive, cognitive. These domains were then

split in to a total of fifteen sub-codes. For example, the negative domain was split into four sub-codes: failure, loss, unpleasant-physical, and danger. The authors predicted that disgust elicitors would fall into the general negative category and the more specific unpleasant-physical category (Haidt & Keltner, 1999). Events with negative implications for the self's goals, attachments, and hedonics were assigned to the negative category. Events that fall in the unpleasant-physical category described exposure to things that are physically unpleasant. Results indicated that participants' provided elicitors of disgust were primarily in line with the predictions, with 73% of the US responses and 93% of the Indian responses in the negative domain and 58% of the US responses and 59% of the Indian responses classified as unpleasant-physical.

Galati and colleagues (2005) asked participants from Italy, Spain, and Cuba to provide descriptions of events eliciting strong emotions without being specified which emotion experiences to describe. Unfortunately, this resulted in a small number of disgust events described and the authors were unable to assess differences between groups in antecedent events. However, participants were asked to provide their appraisals of the eliciting events by rating the event on the following dimensions: novelty, pleasantness, goal relevance, coping potential, and compatibility with social and individual norms. The events provided suggested that antecedents to the experience of disgust are novel, unpleasant, not goal conducive, not controllable, often attributed to another person, compatible with individual norms, and not compatible with social norms (Galati et al., 2005).

Scherer and colleagues examined emotion-eliciting events and event appraisals by recruiting participants from 37 countries to recall and provide information about events that elicited various emotions (Scherer, 1997; Scherer & Wallbott, 1994). The researchers found that while some variation between cultures existed, the similarities outweighed the differences.

Emotion profiles were created summing across the countries, rather than describing the profiles for each country or region individually. Results indicated that disgust is an emotion that is experienced frequently, as most of the participants were able to remember recent experiences that elicited the emotions (Scherer & Wallbott, 1994). In addition, disgust was described as a short-lived emotion, with most of the experiences described lasting between a few minutes and an hour. Taken together, the participants' responses suggested that disgust was low in intensity, relatively freely expressed, accompanied by low physiological responses, and related to withdrawal behaviors (Scherer & Wallbott, 1994). The participants' responses also suggested that disgust had negative effects on relationships, was accompanied by little non-verbal behavior, and often resulted in short utterances (Scherer & Wallbott, 1994).

Participants' responses were also used to examine the qualities and universality of the emotion-eliciting events (Scherer, 1997). Results suggested that disgust eliciting events are often unexpected, unpleasant, highly immoral, and unfair (Scherer, 1997). The responses also suggested that disgust did not have a clear causality and typically did not function as a hindrance to a goal. However, the disgust profile based on the chosen dimensions was weaker than some of the other emotion profiles, such as joy, anger, and guilt, and often resulted in the misclassification of disgust-eliciting events as anger-eliciting events. Immorality was the dimension that best discriminated disgust from the other emotions. When the emotion profiles were compared across the culture regions, the disgust profiles were intercorrelated with $r = .61$. However, this intercorrelation was the lowest of the included emotions (joy, anger, fear, sadness, guilt, and shame) indicating that the profiles showed some variation between cultures (Scherer, 1997). The authors did note that the lower correlation could be partly due to the lack of a clear and distinct profile for disgust. The overall pattern of correlation of emotion profiles suggested

that Latin America and Africa profiles were less similar to the other regions (North/Central Europe, the Mediterranean Basin, the New World, and Asia).

Haidt and colleagues (1997) obtained information about disgust elicitors by interviewing non-native English speakers living in the US about disgust-equivalent words in other languages. Words that linked bodily concerns and social and moral concerns were found in most languages, but the types of social and moral concerns described across cultures revealed some differences. For example, American socio-moral disgust is typically elicited by perceived character flaws of others, such as violations of basic dignities of other human beings or the possession of offensive beliefs or attitudes. Japanese descriptions of socio-moral disgust typically referred to everyday social interactions in which other people failed to meet the individual's needs or expectations or the individual failed to meet his or her own standards. The authors concluded that moral disgust is often experienced when their basic assumptions or expectations about the order of society are not met. Using this approach, the American and Japanese differences described above can be explained by the individualistic and collectivist natures of the countries. This conceptualization allows for variation between cultures and suggests that the similarity of these disgust elicitors should be related to the similarity of the culture's morals and social natures.

Certain foods are also regarded as elicitors of disgust (Haidt, McCauley, & Rozin, 1994) and there are cross-cultural differences in the degree to which foods are regarded as 'disgusting'. Indeed, it has been noted that in the United States, there is a particular association between the experience of disgust and food, whereas in Hindu India, the experience of disgust is more often associated with interpersonal and moral violations (Rozin, 1999). Although spiders are often appraised as disgusting in Western cultures, in many other areas of the world (i.e., Indo-China, the Caribbean, and Africa), spiders are frequently eaten as a delicacy (Bristowe, 1932, 1945). A

belief common in many cultures, perhaps more so in Western cultures, is “you are what you eat“(Rozin, 1990). This belief suggests that an individual takes on some of the physical, behavioral, and intentional properties of the consumed item (Rozin & Nemeroff, 1989). A disgust response to a food item can therefore be a reaction to either the item itself or to someone or something the item was in contact with prior to consumption. It is suggested that these beliefs explain some cultural practices related to food, such as refusing to eat food prepared by an enemy or someone of a lower class (Rozin, 1990).

Fears

Disgust has been linked with the development and maintenance of several anxiety symptoms and disorders, including small animal phobia, blood-injection-injury (BII) phobia, and Obsessive Compulsive Disorder (OCD) (Olatunji & Sawchuk, 2005). However, cross-cultural findings linking disgust and anxiety disorder symptoms are very limited. Davey and colleagues (1998) did examine animal fears in seven countries (i.e., United Kingdom, India, United States, the Netherlands, Korea, Hong Kong, and Japan). Participants were asked to rate their level of fear towards 51 animals. Factor analyses revealed that a three-factor structure (fear relevant, fear irrelevant, and disgust relevant) was supported in all samples. The authors reported that the animals that loaded onto the disgust relevant factor were fairly consistent across cultures with cockroach, spider, worm, leech, bat, lizard, and rat significantly loading onto the disgust relevant factor across all seven countries. Differences between the countries did emerge, however; Indian participants reported lower levels of fear to the disgust relevant animals than all other countries and Japanese participants reported significantly higher levels of fear towards disgust relevant animals than participants from India, UK, USA, Korea, and Hong Kong. Similarly, the Indian disgust relevant fear factor contained fewer animals than the other countries, while the Japanese

disgust relevant fear factor contained more animals than all other countries. Although some differences did emerge, disgust related animal fears appeared to be more similar than different across countries.

Recently, Olatunji, Sawchuk, de Jong, and Lohr (2006) examined the relation between disgust sensitivity and BII fears in US and Dutch samples. US participants reported higher levels of disgust towards foods, sex, envelope violations (i.e., injections), hygiene, death, and sympathetic magic (stimuli without infections qualities of their own that either resemble contaminants or were once in contact with contaminants) domains. No differences emerged between the US and Dutch participants on disgust towards small animals and body products domains. However, the samples did differ in their levels of BII fears, with US participants reporting greater fears of injections and blood draws and Dutch participants reporting greater fears of mutilations. Disgust sensitivity and level of BII fears were correlated in both samples, but the correlation was stronger in the US sample (medium to large) than in the Dutch sample (small to medium). However, the hypothesized relations between disgust and BII fears were found in both samples. The findings suggest that the frequency and strength of disgust sensitivity may vary by culture, but that some basic relations between disgust sensitivity and phobic fears are likely to exist.

Sawchuk, Olatunji, and de Jong (in press) recently examined differences in the relation between disgust and contamination-based OCD in US and Dutch samples. Stepwise regression analyses revealed that disgust towards Injections and Blood Draws, Hygiene, and Smells reliably predicted contamination fear scores in both samples. However, disgust towards Injections and Blood Draws was the dominant predictor in the Dutch sample whereas disgust towards Hygiene concerns was the dominant predictor in the US sample. Furthermore, while female gender was a

significant, independent predictor in the US sample, this variable did not successfully predict contamination concerns in the Dutch sample. Subsequent comparisons of core and animal reminder disgust domains suggested that contamination fear in the Dutch sample is best predicted by a combination of core and animal reminder disgust elicitors, whereas contamination fear in the US sample was best predicted by only core disgust domains.

Emotion Language

One challenge in cross-cultural research is overcoming the language barrier. In order to compare results across countries, it is essential that participants in all countries are participating in the same study. This requires that instructions, questions, and answers be similar across cultures. In emotion recognition studies, it is essential that the words chosen to represent specific emotions have the same meaning in all languages. Complicating the translation process, all of the proposed basic emotions are represented by single words in the English language, while other languages may not have an appropriate word representing the emotion, may not differentiate between two of them, or include emotions important to that culture that do not have an English translation (Haidt & Keltner, 1999; Russell, 1991b).

Cross-cultural research typically relies on translation and back translation to ensure that words are equivalent across languages. In order to achieve this, one translator is asked to translate a word from its original language into the new language. A second translator is then asked to translate the word in the new language back to the original language. The production of the original word in the back translation is interpreted to mean that the chosen word in the new language is the correct interpretation of the original word. However, little research has examined the effectiveness of this process. What research does exist has cast some doubt on the appropriateness of this procedure. Russell and Sato (1995) compared the original English word

and the equivalent words in Japanese and Chinese identified through the back translation process for 14 emotion words, including disgust. Instead of asking the participants to identify the emotion portrayed in a photograph of a facial expression, the participants were asked to "judge (on a seven point scale) how good each face shown was as an expression of someone who feels X, where X was one of the emotion words" (Russell & Sato, 1995). The authors then examined the correlations between samples. Twelve of the fourteen emotion words were designated as good translations after yielding high correlations. However, disgust was one of the problem words. The Japanese word for disgust was dissimilar to the English and Chinese words (which were similar to each other). The Japanese word for disgust was correlated at .18 with the English word and at .09 with the Chinese word (the English and Chinese words were correlated at .83) (Russell & Sato, 1995). When the words were depicted in a two-dimensional space, with valence and arousal as the dimensions, the Chinese and English disgust words fell in a similar area on the plot near angry and scared. The Japanese word fell in a different area of the plot near the words related to sadness. These results suggest that traditional methods for identifying appropriate translations of disgust may not be as effective as was formerly believed.

Conclusions

Disgust is a basic human emotion that may be characterized by a unique signal, physiological response, and theme of antecedent events (Ekman, 1999). Cross-cultural studies of disgust have examined each of these characteristics. The signal that has received the most attention is the facial expression associated with disgust (upturned upper lip, wrinkled nose, and dropping of the mouth corners). This facial expression has been associated with the emotion of disgust at rates higher than predicted by chance in numerous studies, using varied methodologies and samples (Biehl et al., 1997; Ekman et al., 1987; Ekman & Friesen, 1971; Ekman et al., 1969;

Haidt & Keltner, 1999; Huang, Tang, Helmseste, Shiori, & Someya, 2001; Matsumoto, 1992; Matsumoto & Ekman, 1989; Hejmadi et al., 2000; Russell et al., 1993; Yik & Russell, 1997). In forced choice studies, disgust was reported as the emotion most commonly associated with the disgust photograph in all but two cases (Ekman et al., 1969; Yik & Russell, 1997). Findings have revealed that the modification of the basic identification task to allow participants to provide their own emotion has only slightly reduced the percentage of participants labeling the disgust expression with the disgust emotion and has consistently resulted in 50% or greater correct identification (Haidt & Keltner, 1999; Hejmadi et al., 2000; Russell et al., 1993). However, Western cultures have somewhat consistently yielded higher accuracy scores than non-Western cultures (Ekman et al., 1969; Matsumoto, 1992; Matsumoto & Ekman, 1989).

The examination of disgust recognition in isolated cultures has produced mixed findings, with participants producing higher accuracy rates when asked to pair a face with an emotional story as opposed to the typical pairing of the emotion word with the facial expression (Ekman et al., 1969; Ekman & Friesen, 1971). Despite these differences, participants across cultures have consistently paired the disgust emotion with the disgust facial expression, which provides support for the universal experience of the disgust emotion. Providing additional support for the universality of the disgust emotion, the few studies comparing the physiology related to disgust between cultures have suggested that the physiological reaction is similar across cultures (Tsai et al., 2002; Tsai & Chentosva-Dutton, 2003; Levenson et al., 1992).

While findings suggest that the presence of disgust appears across cultures, some of the characteristics of disgust may be vulnerable to cultural influence. Several studies examining the perceived intensity of facial expressions of disgust have revealed significant differences across cultures (Biehl et al., 1997; Ekman et al., 1987; Matsumoto, 1993; Matsumoto et al., 1999).

While general themes of disgust elicitors appear to be consistent across cultures, some variation appears in the specific elicitors provided by participants from different cultures (Haidt et al., 1997; Haidt & Keltner, 1999; Scherer, 1997; Scherer and Wallbott, 1994; Tsai & Chentsova-Dutton, 2003; Tsai et al., 2002). Taken together, the extant research appears to suggest that disgust is a universal emotion. However, cultural variations may influence the experience and elicitors of disgust.

Additional cross-cultural research on disgust is needed to clarify inconsistencies between past findings and to address questions that have thus far remained unanswered. Russell and Sato's (1995) findings related to the accuracy of the back-translation process have some dire implications for both future and past research. Past research has typically relied upon the back translation process to validate their methods. Additional research assessing more advanced ways of ensuring the meanings of words across languages is needed. Another limitation of the reviewed research is that disgust has predominantly been studied along with other emotions. Studies that examine disgust independent of other emotions would be able to obtain information specific to disgust and allow for a more detailed inspection of the emotion, likely identifying more subtle differences between cultures.

The progression of cross-cultural work has been described using a series of phases that evolve from noticing differences to explaining differences (Matsumoto & Yoo, in press). Phase one studies included examinations of cross-cultural comparisons that document differences between studies without providing information about the source of the differences. Phase two of cross-cultural research consists of the identification of meaningful dimensions of cultural variability. These dimensions describe ways that cultures might differ from each other, such as the individualism vs. collectivism distinction. Phase three identifies ways to predict and explain

these differences in the individuals within the culture. Matsumoto and Yoo (in press) suggest that the majority of previous cross-cultural research has fallen into one of the previous three phases. However, a new phase of cross-cultural research consisting of linkage studies are desperately needed (Matsumoto & Yoo, in press). Linkage studies are described as empirical tests of the link between the observed differences and the cultural sources proposed to explain the differences. The majority of the studies examining disgust cross-culturally have been phase one studies that simply assess and report differences between cultures. The most common variable that has been theorized to be related to disgust differences is individualism-collectivism (e.g., Haidt et al., 1997; Matsumoto, 1992; Matsumoto et al., 1999). As research examining the experience of disgust continues to move forward, it is suggested that future cross-cultural research focus on assessing differences in disgust in less studied areas (e.g., the development of disgust, the relation between disgust and psychopathology) with emphasis on offering theoretical models that can explain differences that may exist.

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Table 1.

Percent Accurate Identification of Disgust Expressions Using Forced Choice and Free-response Methods in Past Cross-cultural Studies.

Study	Country (% correct identification)	Stimuli used
Forced Choice		
Biehl et al., 1997	US (81), Japan (75), Sumatra (76), Vietnam (57), Poland (83), Hungary (84)	JACFEE
Boucher & Carlson, 1980	American stimuli: US (87), Malay (67) Malay stimuli: US (57), Malay (52)	American stimuli- coded using FACS Malay stimuli- created for study chosen by poser & experimenter
Ducci et al., 1982	Ethiopia (55)	Obtained from Ekman & Friesen, coded using FACS
Ekman, 1971	US (86), Brazil (86), Chile (85), Argentina (79), Japan (82), New Guinea Dani (91), New Guinea Fore (85)	New Guinea participants used emotion story task, all others standard. Selected using the Facial Action Scoring Technique
Ekman & Friesen, 1971	New Guinea Fore adults (77, 89); children (95, 78)	Emotion Story
Ekman et al., 1987	Estonia (71), Germany (61), Greece (77), Hong Kong (65), Italy (89), Japan (60), Scotland (79), Sumatra (70), Turkey (74), US (86)	Chosen for study using FACS

Ekman et al., 1969	US (82), Brazil (86), Japan (82), New Guinea Pidgin (29), New Guinea Fore (44), Borneo (not highest response)	Chosen for study
Haidt & Keltner, 1999*	US (78), India (83)	Chosen for study using FACS
Hejmadi et al., 2000*	US (96, 60, 92), India (65, 57, 52)	Created emotion portrayals based on classic Indian dance texts
Huang et al., 2001	Chinese (50); compared to past US results	JACFEE
Izard, 1971	US (83), English (85), German (73), Swedish (88), French (79), Swiss (78), Greek (88), Japanese (56), African (55)	Chosen for study
Matsumoto, 1992	US (91), Japan (75)	Same as Matsumoto & Ekman, 1989
Matsumoto & Ekman, 1989	US (78), Japan (68)	Created for study using FACS
McAndrew, 1986	Malaysia (98)	From Ekman & Friesen (1975)
Yik & Russell, 1999.	Canada (57), Chinese (57), Japan (30)	From Ekman & Friesen (1976)
Free-Response		
Haidt & Keltner, 1999*	US (64), India (82)	Chosen for study using FACS
Hejmadi et al., 2000*	US (83, 65, 74), India (67, 54, 71)	Created emotion portrayals based on classic Indian dance texts

Russell et al., 1993	Narrow criteria: Canada (62), Greece (68), Japan (50) Broad criteria: Canada (66), Greece (68), Japan (56)	JACFEE

Notes. FACS = Facial Action Coding System, Ekman & Friesen, 1978. JACFEE = Japanese and Caucasian Facial Expressions of Emotion, Matsumoto & Ekman, 1988. * Two studies included both forced-choice and free response conditions in their studies. Results for each type of method are presented in the corresponding section.

Table 2.

Examples of Disgust Elicitors Provided in Five Culturally Diverse Samples.

Country	Common Disgust Elicitors
India	Feces, urine, toilets, worn clothes, flies, insects, dead rat, dead cricket in food, rotting flesh
Burkina Faso, West Africa	Feces, unswept yard, flies on food, dirty latrine, diarrhea, sores, dirty food, worms, impure substances associated with birth
Netherlands	Feces, hairs, vermin, cats, dogs, rotten waste, aphids in lettuce, pollution, drug users
United Kingdom	Feces, vomit, wounds, stained kitchen, flies, rotten food, dirty hotel, drunks, rude people
International Airport	Feces, animal saliva, spitting, sweat, vomit, rotten food, bad smells, insects, mucus

Note. Adapted from Curtis and Biran (2001).

Figure 1. Prototypical Disgust Expression