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The Loomingness of Danger: Does It Discriminate Focal Phobia and General Anxiety from Depression?[1]

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In three studies, we examine the apparent loomingness, or rapid forward motion, that anxious individuals may perceive in danger. Results of the current studies show that individuals who are phobic of specific focal stimuli—spiders—may perceive loomingness in the dangers they typically fear but not in other dangers. Conversely, individuals who are generally anxious in mood perceive loomingness in dangers which are related to general anxiety but not in those related to spiders. Although the apparent loomingness of dangers is positively related to anxiety and specific phobic fears, it appears to be unrelated or negatively related to depression. Results of path analyses (Studies 1 and 2) and a study with an experimental methodology (Study 3) appear to be consistent with a proposed mediated sequence in which the perception of loomingness in danger helps to activate threat cognitions that lead to anxiety and fear.

KEY WORDS: anxiety; fear; phobia; animal-phobia; spider-phobia; looming; threat-cognitions; threat.

Most individuals would feel personally alarmed and anxious if a menacing source of danger were to start suddenly surging or relentlessly moving closer to them. People who are usually and generally anxious may tend to typically view the environment in this frightening fashion much of the time. Such an anxious person may view sources of danger as continuously ad-

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vancing and growing, and even relentlessly moving closer to or looming toward his or her personal proximity.

In part, the person's anxiety may be due to the anticipation that the danger has a forward velocity and acceleration: The velocity is the belief that the danger can be increasing instantaneously with each increment in the passage of time; the acceleration of danger is the belief that the velocity itself seems to be increasing with respect to time. Both the forward velocity and acceleration of danger may similarly contribute to the person's belief that the danger is "looming" or rapidly moving closer in temporal and/or physical proximity.

A recent "harm-looming" model (Riskind, 1991) asserts that an adequate cognitive model of anxiety and fear must include a description of the role played by this apparent looming or "loomingness" of danger. The *apparent loomingness* of danger is important because it may help to spark threat cognitions that kindle and maintain anxiety. For example, the person may think that the probability of imminent harm is increased as a result of the apparent loomingness of the danger.

In addition, the apparent loomingness of dangers to the person is important because this can help to discriminate between the person's reactions of anticipatory anxiety and reactive depression. For example, the person who is anxious may tend to automatically imbue danger with apparent loomingness and rapid forward motion in time and space. The person who is depressed, however, may tend to imbue the danger with slow movement because disaster or defeat has already arrived (for studies indirectly suggesting these inferences, see Costello & Comrey, 1967; Karoly & Ruehlman, 1983; Ruehlman, 1985). This proposed difference in thinking is critical because there has been much recent debate about whether the syndromes of anxiety and depression can be distinguished by their thinking content or symptoms (Dobson, 1985; Gotlib, 1984; Kendell & Watson, 1989; Riskind, Castellon, & Beck, 1989).

The harm-looming model posits that anticipatory anxiety or fear is guided by cognitive scripts that contain roles, props, and sequence rules (Fiske & Taylor, 1984; Schank & Abelson, 1977). Just as a restaurant script requires a waiter and menu before it can progress to its end, a fear script requires forward movement and increasing proximity in time or space before the arrival of the object or event that is the source of danger. A useful metaphor for this concept of looming threat movement is given by developmental and ethological studies of the "looming effect" (Ball & Tronick, 1971; Schiff, Caviness, & Gibson, 1962). These studies found that both human and primate infants respond to the rapid visual approach of a threat stimulus with agitation, startle, and fear reactions.

The harm-looming model assumes that individual differences in dispositions of anxiety are related to differences in the fear scripts that people

apply to anticipated future experiences. For example, if the person is specifically fearful or phobic of spiders, s/he may generically perceive loomingness in spiders even when they are motionless. Coupled with this, the person who is phobic may also refer any actual movement perceived—particularly forward movement—to the fear script and interpret it as looming movement. However, the spider-phobic person would not necessarily imbue apparent loomingness in other stimuli or dangers, such as dogs, snakes, or social rejections.

A disposition to general anxiety may be related to a tendency to apply multiple fear scripts to common areas of experience. For instance, the person who is generally anxious may imbue the typical dangers related to general anxiety (e.g., Beck & Emery, 1985) such as possible rejections or injury with apparent loomingness but not necessarily do this for specific stimuli such as spiders.

The Present Studies

The present three studies sought to directly examine some of the predictions of the harm-looming model. In the first two studies, we gave subjects measures of the apparent loomingness of spiders and of dangers presumed related to general anxiety, measures assessing the subjects' fear of spiders, and measures of general anxious and depressed moods. We expected the high-fear-of-spider subjects to perceive more loomingness in spiders than low-fear subjects but not in dangers related to general anxiety. Furthermore, we expected the apparent loomingness of the latter dangers to be related to general anxiety and not to spider phobia; and, we expected apparent loomingness of both kinds of danger to be negatively related to depression. We also examined in these studies whether the effects of loomingness on fear are transmitted by standard threat cognitions. The third study used a manipulation of movement with videotapes of spiders and rabbits to explore the effects of movement on fear.

STUDIES 1 AND 2

Method

Subjects

Undergraduate students in introductory psychology classes at George Mason University (n = 80 in Study 1; and n = 104 in Study 2) volunteered

to participate in the research in return for extra course credit. The analyses of the two studies focused primarily on high-fear (n = 19 in Study 1; n = 22 in Study 2) and low-fear (n = 21 in Study 1; n = 32 in Study 2) subjects who met the criteria for inclusion discussed below. However, the results for the total subject samples were retained for regression and correlational analyses.

Procedure

To be selected for the fear groups, subjects had to meet two criteria. They were selected for the high-fear group only if they labeled themselves as "afraid of spiders" and had above-median scores on an index computed from a spider phobia questionnaire by Watts and Sharrock (1984). The subjects qualified for the low-fear group only if they labeled themselves as "not afraid" and had below-median scores on the index. The mean overall age of the subjects who were selected for the two studies was 20.03, with a range from 17 to 36; 43% were men and 57% were women. The high- and low-fear groups did not differ significantly in age or gender.

As part of the study, the subjects assembled in small groups of from 10 to 25 persons and were asked to complete the following series of questionnaires.

Measures

Watts and Sharrock Questionnaire. The 43 items of the Watts and Sharrock Questionnaire require *yes* or *no* responses and offer scores for three subscales: vigilance (e.g., checking the lounge for spiders before sitting down), preoccupation (worrying more about spiders than most people), and avoidance-coping (getting other people to get rid of spiders). Watts and Sharrock (1984) demonstrated that scores on the three subscales distinguish spider-phobic from nonphobic individuals and correlate with behavioral avoidance and other measures of fear. The composite index for each subject was computed from his/her score for the three subscales (vigilance, preoccupation, avoidance).

Spider Looming Questionnaire (SLQ). Each subject was given a packet consisting of a photograph of a tarantula taken from a standard biology textbook, with a 17-item questionnaire assessing loomingness, threat, and fear. Scores for each variable were averaged over several items rated on 1–7 scales so that scores ranged from 1 to 7.

1. *Loomingness of spiders.* The looming threat motion and rapidly increasing proximity perceived in spiders was assessed by the average of five items (e.g., How actively and energetically is the spider moving to you? How quickly could this situation become more dangerous? How slow or fast is it moving toward you? How physically mobile is the spider? Is the speed constant or increasing?). This measure exhibited high internal consistency (coefficient alphas = .93 in both studies, with item-total intercorrelations ranging from .69 to .87 total scores).
2. *Threat cognitions, fear.* Twelve remaining items provided a global index of threat cognitions (two items each for danger, probability of harm, imminence, uncontrollability, and unpredictability) and an index of fear (two items). The index of threat cognitions had high internal consistency in both studies (coefficient alphas = .93 and .94). Item correlations between the two items in the measures for imminence, probability of harm, etc., ranged from .57 to .82 in both studies, except for the lack of control measure which ranged from $r = .33$, $p < .001$, to $r = .62$, $p < .001$. In Study 1, the two-item measure of fear had an item intercorrelation of .78, $p < .001$. In Study 2, two items assessing disgust and repulsion were added, which resulted in a four-item fear index (coefficient alpha = .92).

Harm-Looming Questionnaire. A more general maladaptive cognitive style that leads persons to perceive apparent loomingness and rapidly increasing proximity in dangers typical of general anxiety was assessed with the Harm-Looming Questionnaire (HLQ; see Riskind, 1989, for details of development). The HLQ (see Appendix 1 of Riskind, 1989) provides brief descriptions of potential harm situations (e.g., risk of rejection, termination from a job, risk of moving traffic on the highway) frequently faced by adults including college students. Following each story are questions used to assess the extent the subject perceives loomingness in danger.

As an example, in one story the individual is asked to "Suppose that you have made a mistake in a new job with a new boss, for which you might be fired." The subject is told to imagine the situation and to answer five relevant questions on 7-point scales (e.g., "How active and energetic is the process by which the boss could fire you?" "How slow or fast is the process by which the boss could fire you?" "How quickly could this situation become more dangerous to you?" "To what extent is the boss filled with a strong tendency to act in this situation?" "Is the process moving at a constant rate or speeding up?").

Scores for these five HLQ items were averaged over the six stories on 7-point scales. Thus, again, the looming tendency scores could range from 1 to 7. Previous analyses have shown that HLQ scores correlate with anxiety on the Spielberger State/Trait Inventory (STAI; Spielberger, Gorsuch, Lushene, 1970) (r in all cases ranges from .24 to .45, $p < .001$), show adequate internal consistency (with coefficient alphas from .87 to .94), and have a test–retest reliability of .72.

Other Measures. Subjects completed the two 20-item scales of the STAI (Spielberger, Gorsuch, & Lushene, 1970), one to assess anxiety at the time of test taking (State Anxiety) and one to assess anxiety as generally felt (Trait Anxiety). The 21-item Beck Depression Inventory was given to test the specificity of perceptions of motion to anxiety and fear and not depression (BDI; see Beck, Rush, Shaw, & Emery, 1979, for the self-report version of the original scale see Beck, Steer, & Garbin, 1988). Tanaka-Matsumi and Kameoka (1986) report recent evidence on the reliability and validity of these measures. In Study 2, the Fear Survey Schedule (FSS; Geer, 1965) was given in order to evaluate the prevalence of other phobias in the subjects.

Thus, the subjects in these two studies were divided into high- and low-fear groups on the basis of two indices of their fear of spiders, and their perceptions of loomingness and threat were compared.

Results

Check on the Composition of the Fear Groups

One-way analyses of variance were conducted to assess group differences in self-reports of fear and in threat cognitions. As shown by Table I, the high-fear groups were higher, as expected, than the low-fear groups on the two selection criteria for spider phobia, all $p < .0001$. The high-fear subjects were also higher in threat cognitions of the spider on the SLQ than the low fear subjects, all $p < .001$.

Perceptions of Looming-Motion and Increasing Proximity

It will be recalled that the high-fear subjects was predicted to perceive more apparent loomingness in spiders than the low-fear subjects, and this difference, in turn, was expected to be far greater than the difference in

Table I. Means and Standard Deviations (in Parentheses) for High-Fear and Low-Fear Groups

Dependent measures[a]	High-fear group	Low-fear group	Univariate *F*-tests
	Study 1		
Watts and Sharrock (1984) Spider Phobia Index	(n = 19) 10.89 (2.31)	(n = 21) 4.27 (1.28)	$F(1, 39) = 133.96$, $p < .0001$
Loomingness in spiders (SLQ)	5.00 (1.39)	2.95 (1.29)	$F(1, 39) = 23.62$, $p < .001$
Loomingness in other dangers (HLQ)	4.83 (0.60)	4.35 (0.71)	$F(1, 38) = 5.23$, $p < .05$
Fear of spider	5.42 (0.95)	2.39 (1.31)	$F(1, 39) = 70.20$, $p < .0001$
Threat cognitions Index	4.32 (1.57)	2.18 (1.12)	$F(1, 39) = 25.05$, $p < .0001$
Depression (BDI)	9.44 (6.08)	6.33 (5.52)	$F(1, 38) = 2.81$, p = n.s.
Trait anxiety (TAI)	44.2 (12.0)	35.6 (10.0)	$F(1, 38) = 6.08$ $p < .02$
State anxiety (SAI)	43.2 (10.6)	35.8 (11.8)	$F(1, 38) = 4.42$, $p < .04$
	Study 2		
Watts and Sharrock (1984) Spider Phobia Index	(n = 22) 14.64 (4.92)	(n = 32) 1.94 (0.92)	$F(1, 52) = 200.61$, $p < .0001$
Loomingness in spiders (SLQ)	5.19 (1.39)	2.67 (1.29)	$F(1, 52) = 58.60$, $p < .0001$
Loomingness in other dangers (HLQ)	4.49 (0.60)	4.15 (0.71)	$F(1, 37) < 1$, p = n.s.
Fear–disgust of spider	6.22 (0.77)	2.91 (1.17)	$F(1, 52) = 133.50$, $p < .0001$
Threat cognitions Index	4.35 (1.25)	2.15 (0.84)	$F(1, 52) = 60.41$, $p < .0001$

Table I. Continued

Dependent measures[a]	High-fear group	Low-fear group	Univariate *F*-tests
	Study 2		
Depression (BDI)	10.65 (7.07)	7.24 (5.81)	$F(1, 52) = 4.79$, $p < .03$
Trait anxiety (TAI)	45.3 (10)	39.8 (11.4)	$F(1, 52) = 2.55$, p = n.s.
State anxiety (SAI)	40.8 (11.6)	36.0 (10.2)	$F(1, 52) = 1.88$, p = n.s.

[a]*Note*: SLQ: Spider Looming Questionnaire; HLQ = Harm-Looming questionnaire; BDI = Beck Depression Inventory; TAI = Trait Anxiety Index; SAI = State Anxiety Index.

the apparent loomingness of other possible dangers. In particular, the between-group difference on the Spider Looming Questionnaire was predicted to be far larger than the one on the Harm Looming Questionnaire.

As Table I shows, the means fall in this predicted pattern. The two-way repeated-measures analyses of variance, with measure as the repeated measures factor, found main effects for fear group, with $F(1, 39) = 27.01$, $p < .0001$, in Study 1, and $F(1, 36) = 22.61$, $p < .0001$, in Study 2. In addition, they revealed the predicted Fear Groups × Measure interaction effects in each study, $F(1, 39) = 20.84$, $p < .001$, in Study 1, and $F(1, 36) = 19.67$, $p < .001$, in Study 2. As predicted, the significant interactions reflected group differences in perceived loomingness that were significantly stronger in subjects' perceptions of spiders ($p < .001$ in both studies) than in their perceptions of other dangers ($p < .05$ in Study 1 and $p < .10$ in Study 2).

A reliable main effect for measure was found in Study 1 [$F(1, 39) = 6.65$, $p < .02$] but not in Study 2 ($F < 3$, $p < .11$); this suggests that subjects perceived greater loomingness in spiders across the board than they did in other dangers.

Other Differences in Anxiety and Depression

The high-fear subjects thus differed from the low-fear subjects in loomingness, but did they also differ in other unintended ways that may account for the loomingness? The answer appears to be no. As Table I reveals, the high-fear subjects had higher anxiety than the low-fear subjects on the State/Trait Inventory (in Study 1), higher depression on the

Beck Inventory (in Study 2), and higher fear for several extraneous objects on the Fear Survey Schedule (such as worms, dead bodies, being alone, stinging insects, and feeling foolish). (Recall the FSS was given only in Study 2.)

These extraneous symptoms, however, do not seem to account for the group differences in the loomingness of spiders. The fear groups still differed in both studies when the given extraneous symptoms were held constant in analyses of covariance, all $F > 15.91$, all $p < .001$.[3]

Correlations in the Full Samples

It will be recalled that a second prediction was that the apparent loomingness of spiders (on the SLQ) was expected to covary with the person's fear of spiders, whereas the loomingness of other anxiety-producing situations (on the HLQ) was expected to covary with the person's general anxiety. Partial correlations were computed to test these predictions because simple correlations (Table II) may be confounded by the intercorrelations between fear, anxiety, and depression (see Ingram, 1989, for relevant discussion).

As predicted, fear of spiders and the apparent loomingness of spiders were positively correlated, with Trait and State Anxiety and depression held constant ($r > .72, p < .001$, in both studies). Conversely, trait anxiety and the apparent loomingness of dangers typical of general anxiety were positively correlated ($r > .24, p < .03$, in both studies) with fear of spiders and depression held constant. State anxiety was less consistent and only correlated with the loomingness of such dangers in Study 1 ($r > .23, p < .04$) but not in Study 2 ($r = .14, p =$ n.s.).

Also as expected, no correlations were significant between the apparent loomingness of spiders and either trait anxiety ($r < .18, p =$ n.s.) or depression ($r = -.20$ in Study 1, $r = -.02$, in Study 2, $p > .07$ in both studies), with the fear of spiders and depression or anxiety held constant. The partial correlation between the loomingness of spiders and state anxiety, however, was reliable in Study 1 ($r > .25, p < .04$) but not in Study

[3]An inconsistent pattern of gender effects also emerged in the two studies: A significant Gender × Fear Group interaction was found for perceptions of looming tendency in spiders, with the differences between the fear groups more accentuated for females than for males, but only in Study 1, $F(1, 36) = 6.42, p > .02$, not in Study 2, $F < 2$. A significant Gender × Fear Group interaction was found for the global threat index also, with the differences between the fear groups more accentuated for males than for females, but only in Study 2, $F(1, 50) = 7.68, p < .008$, not in Study 1, $F < 2$. No gender differences in fear were found.

Table II. Intercorrelations Among Measures of Loomingness and Other Measures[a]

Variables	1	2	3	4	5	6	7	8	9
1. Self-label of phobia	—								
2. WS Spider Phobia Index	.39 (.49[b])	—							
3. Fear of spider	.30 (.59[b])	.52[b] (.65[b])	—						
4. Global Threat Index	.24[d] (.55[b])	.43[b] (.58[b])	.74[b] (.79[b])	—					
5. Loomingness in spider (SLQ)	.18 (.53[b])	.48[b] (.57[b])	.72[b] (.79[b])	.84[b] (.81[b])	—				
6. Loomingness in other dangers (HLQ)	.10 (.06)	.35[c] (.14)	.18 (.26[d])	.23[d] (.34[c])	.33[b] (.35[b])	—			
7. BDI-depression	.23[d] (.10)	.07 (.27[c])	.00 (.17)	.00 (.15)	−.04 (.14)	.06 (.37[c])	—		
8. Trait-anxiety	.14 (.00)	.26[d] (.27)	.12 (.21[d])	.17 (.12)	.14 (.16)	.23[d] (.43[b])	.75[b] (.64[b])	—	
9. Stait-anxiety	.15 (.05)	.20 (.30[c])	.02 (.15)	.11 (.21)	.09 (.16)	.21 (.32[c])	.66[b] (.53[b])	.80[b] (.65[b])	—

[a]*Note*: $N = 77$ in Study 1; $N = 104$ in Study 2 (results in parentheses). The N in study 2 is only 84 for all correlations for variables 6 throught 9. WS = Watts and Sharrock (1984) Index.
[b]$p < .001$.
[c]$p < .01$.
[d]$p < .05$.

2. Finally, the loomingness of dangers typical of general anxiety was unrelated or slightly negatively correlated with depression, with trait and state anxiety and fear of spiders ($r = -.18$, $p < .07$, in Study 1; $r = .14$, $p =$ n.s., in Study 2) held constant. And the loomingness of these dangers was not related reliably to the fear of spiders (all $r < .20$, all $p > .07$), with general anxiety and depression held constant.

Direct and Mediated Effects of Loomingness on Fear

According to the harm-looming model, loomingness sparks the threat cognitions of the person that in turn influence his or her fear. According to James and Brett (1984), such *mediation* would be tested by three regression models that would test the following:

1. Loomingness in spiders (the causal antecedent, X), predicts threat cognitions (the mediator, M).
2. Threat cognitions (M) predict fear (the consequence, Y).
3. Loomingness (X) does not directly predict fear of spiders (Y) when threat cognitions (M) are held constant.

Gender was included as a control variable in each of the three regression models. The results of these models showed that the apparent loomingness of spiders does, in fact, predict threat cognitions (72.6% in Study 1, 67% in Study 2, $p < .0001$ in both), and that threat cognitions in turn predict fear of spiders (55% in Study 1, 63% in Study 2, $p < .0001$ in both). In addition, loomingness predicts much less fear of spiders when threat cognitions are held constant (2.8% vs. 59% in Study 1; 4.3% vs. 51.8% in Study 2) than when they are not. However, it is noteworthy that the loomingness of spiders still predicts a reliable part of the variance in fear when threat cognitions are held constant (2.8%, $p < .03$ in Study 1; 4.3%, $p < .0002$ in Study 2). As predicted, the effect of loomingness may be transmitted to fear through standard threat cognitions, but perfect mediation is not found.

To examine the best predictor among loomingness and the group of separate threat–cognition variables, we did a final set of multiple regressions. When all of the cognitive variables were simultaneously entered into regressions, only loomingness ($p < .02$ in Study 1, $p < .0001$ in Study 2) and lack of control ($p < .09$ in Study 1, $p < .01$ in Study 2) reliably contributed unique variance to the prediction of the fear of spiders; the probability, imminence, and unpredictability of harm did not.

STUDY 3

Experimental Manipulation of Looming Motion

According to the harm-looming model, the apparent motion of an object enhances threat cognitions and fear more for objects that have threatening characteristics than for those that are nonthreatening. We used videotapes in this study to experimentally manipulate the movement (forward, still, backward) of two animals (spiders and rabbits).

We predicted that there would be an interaction effect between the motion manipulation, the animal manipulation, and fear group. We predicted that the effects of the animal manipulation (spider vs. rabbit) on fear and threat would be highest when looming or forward motion was used, and lower when still or backward motion was used. We expected, in turn, that these findings would be stronger for the high-fear subjects (who presumably have more elaborated and fearful scripts) than for the low-fear subjects.

Method

Subjects

Subjects were screened in the same way as in the preceding studies, through their self-assessment and questionnaire scores, yielding two groups (n = 18 high-fear subjects, n = 21 low-fear subjects).

Procedure

Subjects assembled in small groups of from 4 to 10 persons and were seated in front of a television video monitor to watch video film clips of different animals. In these videotapes, tarantulas and rabbits were seen in three different motion types designed to manipulate the object motion of the stimuli: moving or crawling toward the camera (forward motion), in a stationary position (still), or moving away from the camera (backward motion).

On viewing each of the six videotapes, the subjects completed a Spider Looming Questionnaire or a modified version of the questionnaire for the rabbits (RLQ). Thus, subjects provided fear ratings for each of the animals in each motion type. The order of the motion conditions and the animal type (rabbit or spider) conditions was counterbalanced.

The questionnaire contained the same items to assess the fear and threat experienced by the subjects in the first two studies. The measures were just as reliable as in those studies. However, one item about rapid danger was excluded for the index of looming tendency ("How quickly could the situation become more dangerous?") to increase the purity of the measure as a check strictly on looming motion alone. After the subjects had finished, we played a desensitization tape to reduce any fear caused by viewing the spiders.

Results

Perceptions of Motion

The repeated-measures ANOVA on the manipulation check, with motion as the repeated measure, yielded a reliable main effect due to this motion manipulation, $F(1, 35) = 24.04$, $p < .001$. As expected, subjects perceived greater looming or forward motion in the spider (simple main effect, $p < .001$) and rabbit (simple main effect, $p < .001$) in the forward condition than in the spider or rabbit in the combined backward/still condition. A significant main effect was also found for the animal manipulation, $F(1, 35) = 10.03$, $p < .003$, with subjects perceiving greater loomingness in spiders than rabbits. This main effect was expected because spiders are more generally feared than rabbits.

The main effects, however, were qualified by a significant Fear Group × Animal Interaction, $F(1, 35) = 4.75$, $p < .036$. The two-way interaction indicated, as in Studies 1 and 2, that high-fear subjects perceived a higher mean level of looming motion in *spiders* than did low-fear subjects, $p < .001$, but the high- and low-fear subjects did not differ in mean levels of perceived looming motion in the rabbits, p = n.s. Viewed otherwise, the high-fear subjects perceived more looming motion in spiders than in rabbits ($p < .001$), but the low-fear subjects did not differ in how they perceived spiders and rabbits (p = n.s.).[4]

The analysis also revealed a three-way interaction that on inspection reflected an Animal × Motion interaction that was reliable only for high-fear subjects, $F(1, 35) = 4.18$, $p < .048$. For the high-fear of spider subjects, the motion manipulation (main effect, $F = 17.91$, $p < .001$) had a reliably stronger effect on perceptions of the loomingness of spiders ($p < .001$) than of rabbits ($p < .01$), with a simple Motion × Animal interaction effect, $F = 5.25$, $p < .04$. Yet, for the low-fear subjects, the motion manipulation

[4]Significant group differences were found in the apparent loomingness of the spiders at all levels of movement (simple effect, all $p < .01$).

had equal effects on perceptions of spiders and rabbits (motion main effect, $F = 7.85, p < .01$; Motion × Animal interaction, $F < 1$).

Effects on Fear and the Threat Cognitions Index

Scores for the index of threat cognitions and the index for fear were analyzed by a multivariate measures analysis of variance (MANOVA) in which the between factor was fear group (2) and the repeated-measures factors were motion, animal, and measure (threat cognitions, fear). Two planned comparisons were used with these MANOVAS. The first planned comparison (1 *df*) for the motion manipulation tested the prediction that the most threat cognitions and fear would be elicited by the spider in the forward movement condition, the next highest would be elicited in the backward movement condition, and the least in the still condition. A modest effect on fear for the backward movement was predicted because the backward movement of a spider may slightly accentuate fear as a result of the phobic person's automatic tendency to interpret nearly any spider movement as potentially approaching.

As can be seen from Table III, main effects for animal ($p < .001$), motion ($p < .001$), and fear group ($p < .001$) were qualified by the expected interaction effects between the factors. As predicted, the animal main effect showing that spiders elicited greater threat cognitions and fear than rabbits (all $p < .001$ for simple animal main effects) was by far the strongest in the forward motion condition, somewhat less strong in the backward motion condition, and least strong in the still motion condition, contrast $F(1, 35) = 15.60, p < .001$.

Also as predicted, this expected Animal × Motion interaction was far stronger for the high-fear subjects (simple interaction, $p < .001$) than for the low-fear subjects (simple interaction, $p < .10$), with a significant Animal × Motion × Fear Group interaction $F(1, 35) = 7.61, p < .009$.

The second planned comparison tested the prediction that far more threat cognitions and fear would be elicited by the spiders with forward motion than would be exhibited by the combination of the spiders with either still or backwards motion. The planned contrast (1 *df*) looked at the effects of forward motion vs. no forward motion (backward or still). Again, this analysis revealed the same main effects for animal, motion, and fear group (all $p < .001$), as well as the two-way interactions (all $p < .004$), and a significant Fear Group × Animal × Motion interaction, $F(1, 35) = 5.85, p < .02$.

The univariate analyses on the two measures yielded similar results, except for one exception. The results for the second planned comparison

Table III. Effects of the Manipulations of Looming Movement and Animal Type on the Threat Cognitions and Acute Fear of the High- and Low-Fear Groups of Subjects[a]

Dependent measures	Spider-F	Spider-B	Spider-S	Rabbit-F	Rabbit-B	Rabbit-S
Apparen loomingness of the animal						
HF group						
M	6.19	5.49	5.00	3.89	3.49	3.22
SD	0.86	1.43	1.68	2.07	2.02	2.26
LF group						
M	3.75	3.24	3.07	3.43	3.18	2.26
SD	1.54	1.36	1.37	1.26	1.27	0.99
Threat cognitions						
HF group						
M	5.56	5.07	4.52	1.88	1.70	1.71
SD	1.02	1.26	1.43	0.49	0.55	0.53
LF group						
M	3.03	2.75	2.69	1.61	1.57	1.36
SD	1.60	1.55	1.32	0.42	0.48	0.36
Acute anxiety/fear of animal						
HF group						
M	6.33	5.58	5.21	1.32	1.11	1.10
SD	0.77	1.66	1.81	0.49	0.29	0.26
LF group						
M	3.29	3.05	2.87	1.31	1.29	1.29
SD	1.83	1.79	1.65	0.74	0.74	0.73

[a]*Note:* F = forward movement, *B* = backward movement, S = still; HF = high-fear subjects (n = 18), LF = low-fear subjects (n = 21.)

on fear ratings indicated that the two-way interaction between the motion manipulation and fear group was stronger for female than male subjects, $F(1, 35) = 4.28, p < .05$.

GENERAL DISCUSSION

These results have implications for understanding the thought content that sparks anxiety or focal fear and that differentiates these from depression. Indeed, path analyses using a regression methodology in the two first studies provided support for a mediated sequence in which the apparent loomingness of spiders awakens and sparks threat cognitions that lead to fear of spiders.

Some of the results of the first two studies were tied together by the third study, which used an experimental manipulation of the motion of spiders and rabbits. As predicted, the high-fear subjects were far more threatened when spiders on the videotapes were viewed in actual motion. The forward-moving spider also evoked more threat cognitions and fear than did the backward-moving or still spider.

A possible alternative explanation of these results is that the final ending position of the spider rather than its motion produced the observed differences in threat cognitions and fear. That is, the forward-moving spiders ended up closer in proximity to the subjects viewing the tapes than did the still or backward moving spiders. However, one limitation of this "proximity" explanation is that it cannot explain the fact that the ending position of the backward-moving spider evoked slightly more threat and fear, as well as perceived looming or forward motion, than did the unchanging position of the still spider.

We examined the proximity explanation with a covariance analysis, which showed that the motion of the spiders seemed to have the predicted influence even when proximity was statistically held constant. The proximity (or imminence) items (alpha = .82) were temporarily removed from the threat cognitions index, and we used these as a covariate in a MANOVA on threat cognitions and fear. This analysis yielded the same three-way interaction between motion manipulation, fear group, and animal, $p < .04$ for both planned comparisons, and the same general results, as the earlier MANOVA (for analogous evidence, see Riskind & Maddux, in press). Other relevant evidence that motion kindles fear is provided by the similar results of experiments that have manipulated threat motion while holding proximity constant (Riskind, 1991; Riskind & Wahl, in press). Further studies are still needed, of course, to independently manipulate proximity and motion to separate the effects.

Other earlier covariance analyses indicated that the results were not attributable to unintended differences between the high-fear and low-fear groups in extraneous symptoms and fears. All current results are confined to self-report data, however, and physiological and behavioral measures might be useful in the future. Finally, we have obviously not directly assessed fear scripts in the studies and further work is needed to examine these assumed scripts.

The Specificity of Loomingness to Anxiety and Focal Fear

As predicted, the partial correlational analyses confirmed the specificity of the apparent loomingness of spiders to the fear of spiders. They

fully confirmed the specificity of the loomingness of dangers that are typical of general anxiety to general trait anxiety, but were less consistent for state anxiety. Also as predicted, neither the loomingness of spiders nor of dangers typical of general anxiety was correlated with the other form of anxiety when the anxiety/fear that was predicted to be congruent with it was statistically held constant.

Although we have focused on spider phobia as the focal fear in this study, we do not assume that it is only about the specific fear of spiders. Dangers can loom rapidly closer in time as well as in space and a number of kinds of social and physical dangers can be feared for their loomingness. Obviously, an extension of the results to the loomingness in time and space of dangers relevant to other focal phobias is clearly tentative, and needs to be examined in future studies. Some recent studies testing the harm-looming model have found that the apparent loomingness of the danger of AIDS has an impact on the fear of persons infected with the HIV virus (Riskind & Maddux, 1992), and the apparent loomingness of injury by persons who have psychiatric illness has an impact on the fear of mentally ill persons (Riskind & Wahl, in press). Previous studies have reported that phobic individuals perceive more motion in their images of the small animals they fear (Hekmat, 1987; Weerts & Lang, 1978).

Distinct Thinking Content of Anxiety and Depression

The positive correlations also provided support for our prediction that the apparent loomingness of dangers is a part of the thinking content of anxiety and focal fear and distinguishes these from depression. In contrast to anxiety and fear, depression, which is a reaction to past events that have already arrived, was unrelated or even negatively related to the loomingness of danger. Further studies are clearly needed that test the predictions with different subject samples and measures of anxiety and depression.

Transmission of Effects to Fear

The first two studies found evidence for the prediction that the effects of the apparent loomingness of danger on fear is partially transmitted by standard threat cognitions. As in a recent study by Riskind and Maddux (1992), however, the present results revealed that the apparent loomingness of danger also predicts reliable, unique variance in fear that exceeds the effects accounted for by these standard threat cognitions (2.8% to 4.3%). The finding that the effects of loomingness on fear are

not totally transmitted by standard threat cognitions is expected because loomingness differs from such cognitions in reflecting the "derivatives" of distance with respect to time such as the developmental velocity and acceleration of danger.

Relation to Current Theories

Such effects of the apparent loomingness of danger are generally consistent with the recent views of anxiety and fear that see these as involving a cognitive state of "orienting" to threat (Tellegan, 1985) and a response to future threat (Beck & Emery, 1985) and events that are moving through time (Dobson, 1985). Similarly, Carver and Scheier (1990) (see also, Hsee & Abelson, 1991) posit that anxiety occurs when the person perceives that progress in avoiding a source of negative goals is slower than expected (as expected if a spider or other threat is looming rapidly closer). The focus on loomingness also fits with suggestions in the perception literature that people mentally represent the velocity and acceleration of objects and not their static properties alone (Freyd & Rinke, 1984).

Directions for Research

One intriguing implication of these present results is the suggestion that the state of motion (such as the wriggling and crawling) and the apparent loomingness of fear-relevant stimuli such as spiders or snakes may play a role in the "preparedness" of the stimuli for fear conditioning (e.g., Mineka, 1987; Seligman, 1971). McNally and Steketee (1985) interviewed animal phobics and found evidence in their histories that fear-stimulus movement may often play a role in fear acquisition.

Another suggestion that future work could explore is that anxiety disorders may be alleviated by mental imagery that freezes or arrests the apparent loomingness of danger. This discussion recalls a case study of a urine-phobic individual described by Foa and Kozak (1986). Their patient apparently stopped his fear over drops of urine that were placed on his arm by imagining that he "froze" the spots contaminated by urine to prevent their spread.

In summary, as expected from the harm-looming model, the current three studies found supporting evidence that the apparent loomingness of dangers constitutes a part of the unique thinking content of anxiety and fear but not of depression. The looming model may provide insights into antecedents of threat cognitions that influence anxiety and fear.

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