

Motivational Influences on Attentional Scope

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Abstract

The influence of motivation on attentional scope was investigated using two triad classification tasks. Both tasks allowed subjects to make holistic matches or analytic matches. One of two situational regulatory focus states (promotion, prevention) was induced in subjects before completion of the triad tasks. It was predicted that a promotion focus would engender a preference for holistic matches while a prevention focus would engender a preference for analytic matches. In the first experiment, promotion-focused subjects made more holistic matches than prevention-focused subjects. In the second experiment chronic regulatory focus was also measured, and subjects who experienced regulatory fit made more holistic matches than subjects who experienced regulatory mismatch, and situational regulatory focus alone did not significantly predict the proportion of holistic responses. These results suggest that both regulatory focus and regulatory fit states broaden attention, and that uncontrolled regulatory fit may be driving promotion focus effects.

Keywords: Triad classification; motivation; regulatory focus theory; regulatory fit; perception.

Introduction

Regulatory focus theory (Higgins, 1997) is a framework that can be used to explore the influence of motivation on perception and cognition. There are two regulatory focus systems: promotion and prevention. When someone is thinking about something they would like to achieve or attain, they can be said to be in a promotion-focused state, and are more eager and focused on making gains in the environment. When someone is thinking about something they do not want to lose or a state they want to maintain, they can be said to be in a prevention-focused state, and are more vigilant and focused on avoiding mistakes that will result in losses (Higgins & Spiegel, 2004). People are theorized to have a chronic, unchanging regulatory focus, and in addition to this regulatory focus can be temporarily manipulated experimentally by focusing the subject on promotion or prevention concerns (Higgins, 1997). People living in individualistic cultures (like Canada and the United States) tend to have a chronic promotion focus, while people in more collectivistic cultures tend to have a chronic prevention focus (Elliot, Chirkov, Kim & Sheldon, 2001; Lee, Aaker & Gardner, 2000).

Regulatory focus states have been hypothesized to differentially affect attentional processing. Forster and

Higgins (2005) hypothesized that a promotion focus broadens attention and supports holistic processing while a prevention focus narrows attention and supports analytic processing. Reaction times on a holistic processing task were positively correlated with a chronic promotion focus and negatively correlated with a chronic prevention focus, while reaction times on an analytic processing task were positively correlated with a chronic prevention focus and negatively correlated with a chronic promotion focus.

In addition to the idea that one's chronic regulatory state (promotion or prevention) can influence one's processing abilities, one's chronic regulatory focus can either match or mismatch with manipulated situational/experimental regulatory focus. If one has a chronic promotion focus and is placed in a condition where a situational promotion focus is induced, they can be considered to be in a state of regulatory fit, whereas a person with a chronic promotion focus placed in a situational prevention condition can be considered to be in a state of regulatory mismatch. The converse is also true; thus if one has a chronic prevention focus and is placed in a situational promotion condition, this would be a regulatory mismatch, whereas being placed in a situational prevention condition would create a state of regulatory fit. When *regulatory fit* occurs, one is hypothesized to feel right about what they are doing, and this increases motivation (Higgins, 2000).

It has recently been hypothesized that another consequence of regulatory fit is broadened attention (Memmert, Unkelbach & Ganns, 2010). The authors measured subjects' chronic regulatory focus using a self-report questionnaire and also manipulated situational regulatory focus states using a maze task. Following this induction subjects completed a well-known inattentional blindness task. Subjects who experienced a fit between their chronic regulatory focus and the situational focus induction were more likely to notice a gorilla while counting basketball passes than subjects who experienced a mismatch. The situational focus manipulation did not significantly predict the likelihood of noticing the gorilla.

This leads to the question of whether it is a promotion focus that broadens attention, or regulatory fit. Forster and Higgins (2005) measured chronic regulatory focus but did not control for or manipulate regulatory fit, making it impossible to assess the influence of fit in their study. The results of Memmert et al. (2010) strongly suggest that it is regulatory fit, and not a promotion focus, that broadens

attention. We sought to connect these two lines of research by investigating the influence of both manipulated and chronic regulatory focus states (and the fit or mismatch between them) on attentional scope. We chose triad classification because it provides a simple paradigm where there are no correct or incorrect responses, and holistic versus analytic responses are juxtaposed. Such triad classification tasks have previously been used to measure attentional scope (see Frederickson & Branigan, 2005; Gable & Harmon-Jones, 2010).

We used two similar triad classification tasks in two separate experiments. In Experiment 1 we employed a triad classification set that allowed subjects to make a holistic match, an analytic match, or a random match on each trial. In Experiment 2 we employed a triad classification set that was designed specifically to measure holistic versus analytic preferences. Subjects were presented with a target shape and two comparison shapes on each trial. Subjects could make a triad classification based either on holistic or analytic elements of the shapes. In Experiment 2 we also measured subjects' chronic regulatory focus, so that the influence of regulatory fit versus mismatch could also be investigated. Subjects were put into either a promotion or a prevention focus before completing one of the triad classification sets. For Experiments 1 and 2 we predicted that promotion-focused subjects would make more holistic matches (matches in which overall similarity mattered most) than prevention-focused subjects, while prevention-focused subjects would make more analytic matches (matches in which a single attribute mattered most) than promotion-focused subjects. For Experiment 2 we made the additional prediction that subjects experiencing regulatory fit (a match between their chronic and situational regulatory focus) would make more holistic responses than subjects in regulatory mismatch conditions.

Experiment 1

This experiment was designed to measure the attentional scope of promotion and prevention-focused subjects using a situational regulatory focus manipulation. A control condition was also employed to allow comparison to the two regulatory focus groups.

Method

Subjects 120 undergraduate university students from The University of Western Ontario participated for course credit: 40 in each condition (Promotion, Prevention, Control).

Materials Triads containing holistic, analytic, and random matches were created by the authors using two stimulus dimensions of a Gabor patch: orientation of the light/dark bands and the spatial frequency of the alternating light and dark bands. Each individual stimulus was defined by one of 7 values of orientation (O1—O7) and one of seven values of frequency (F1—F7). Values were distributed such that analytic, holistic, and, random matches were created for each triad. All triads were created so that two stimuli were perfectly matched on orientation (analytic match), two

stimuli shared a similar frequency and orientation but were not perfectly matched (holistic match), and two stimuli did not share a match on frequency or on orientation (random match). The complete stimulus set is shown below in Table 1. For instance in Triad 1 A and B create an analytic match because they share the same orientation value. B and C create a holistic match because they do not share the same frequency or orientation, but have very similar dimension values for both frequency and orientation. A and C create a random match because they do not share a perfect match on orientation, and are quite dissimilar in terms of frequency. Twenty-six triads were created, and the positions of each stimulus (A, B, and C) were randomized across the triads to prevent predetermined responding. An example triad is shown in Figure 1.

Procedure The experiment was presented to subjects as separate studies on "student life", and "perception" that were being run together to save time. No suspicions about the deception were raised during debriefing.

All subjects completed the triad classification task after being randomly assigned to one of three conditions (promotion, prevention, control). In all conditions subjects were told that they would be presented with a series of triads on a computer screen after completing a writing task (the regulatory focus manipulation). A corresponding sheet of paper was labeled with triad numbers and subjects were instructed to enter their classification decisions on this response sheet. Subjects were informed that there were no incorrect or correct responses, and were instructed to select the two that "go together best".

Triads were self-paced; once subjects had circled a response they were instructed to advance to the following triad until the triads were completed.

Regulatory Focus Manipulation. In the promotion condition subjects were asked to write a short essay about their goals and aspirations on a sheet of paper with the instructions at the top. Subjects were instructed to spend between five and seven minutes writing their response. The prevention condition was identical to the promotion condition except that subjects were asked to write instead about their duties and responsibilities. This manipulation has been designed and used to manipulate situational regulatory focus (Higgins, Roney, Crowe, & Hymes, 1994).

In the control condition, subjects were asked to write a short essay describing what they did on a typical day in their life, for the same amount of time as subjects in the promotion and prevention conditions. Following completion of the writing task subjects were instructed to complete the triad classification task.

Table 1: Experiment 1 Triad Stimuli.

Triad	A	B	C
1	F ₁ O ₁	F ₅ O ₁	F ₆ O ₂
2	F ₂ O ₁	F ₆ O ₁	F ₇ O ₂
3	F ₆ O ₁	F ₂ O ₁	F ₁ O ₂
4	F ₇ O ₁	F ₃ O ₁	F ₂ O ₂
5	F ₁ O ₂	F ₅ O ₂	F ₆ O ₃
6	F ₂ O ₂	F ₆ O ₂	F ₇ O ₃
7	F ₆ O ₂	F ₂ O ₂	F ₁ O ₁
8	F ₇ O ₂	F ₃ O ₂	F ₂ O ₁
9	F ₁ O ₃	F ₅ O ₃	F ₆ O ₄
10	F ₂ O ₃	F ₆ O ₃	F ₇ O ₄
11	F ₆ O ₃	F ₂ O ₃	F ₁ O ₃
12	F ₇ O ₃	F ₃ O ₃	F ₂ O ₃
13	F ₁ O ₄	F ₅ O ₄	F ₆ O ₅
14	F ₂ O ₄	F ₆ O ₄	F ₇ O ₅
15	F ₆ O ₄	F ₂ O ₄	F ₁ O ₃
16	F ₇ O ₄	F ₃ O ₄	F ₂ O ₃
17	F ₁ O ₅	F ₅ O ₅	F ₆ O ₆
18	F ₂ O ₅	F ₆ O ₅	F ₇ O ₇
19	F ₆ O ₅	F ₂ O ₅	F ₁ O ₄
20	F ₇ O ₅	F ₃ O ₅	F ₂ O ₄
21	F ₁ O ₆	F ₅ O ₆	F ₆ O ₇
22	F ₂ O ₆	F ₆ O ₆	F ₇ O ₇
23	F ₆ O ₆	F ₂ O ₆	F ₁ O ₅
24	F ₇ O ₆	F ₃ O ₆	F ₂ O ₅
25	F ₁ O ₇	F ₅ O ₇	F ₆ O ₆
26	F ₂ O ₇	F ₆ O ₇	F ₇ O ₆

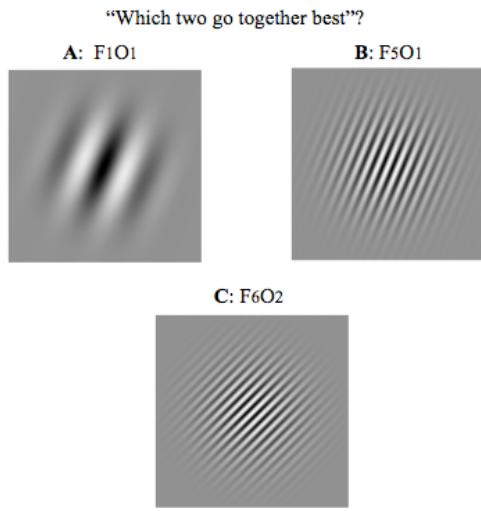


Figure 1: Triad 1 from Experiment 1. A and B create a single-dimensional, analytic match. B and C create a holistic match. A and C create a random match.

We predicted that subjects in the promotion condition would make a greater number of holistic matches relative to the prevention condition and that subjects in the prevention condition would make a greater number of analytic matches

relative to the promotion condition. For the control condition we reasoned that if the average person is more likely to be promotion-focused than prevention-focused that they would resemble the promotion condition more than the prevention condition. To test our predictions we computed the proportion of holistic, analytic, and random triad responses for each subject across the three conditions.

Results

The proportion of each response type (holistic, analytic, random) was calculated for each subject by counting the number of selections of each response type and dividing each number by the total number of triads presented in the task (26). These proportions were averaged within each condition to create three proportions for each condition. The mean proportions of each response type are presented in Table 2.

A mixed analysis of variance was conducted to see if there were any group differences, with condition (promotion, prevention, control) as a between-subjects variable and response type (holistic, analytic, random), as a within-subjects variable. A significant interaction between condition and response type was found, $F(2, 117) = 4.60, p < .05, \eta^2 = .073$. A multiple analysis of variance was conducted to further explore the significant interaction between condition and response type. The proportion of holistic responding differed significantly by group, $F(2, 117) = 3.93, p < .05, \eta^2 = .063$. The proportion of analytic responding approached significance, $F(2, 117) = 2.96, p < .06, \eta^2 = .048$, and the proportion of random responding did not reach significance, $F(2, 117) = 2.44, p < .09, \eta^2 = .040$. Tukey’s Honestly Significant Difference tests showed that the promotion condition made significantly more holistic responses than the prevention condition, $p < .05$. No other differences reached significance ($p > .05$).

Discussion

We wanted to investigate whether situational regulatory focus would influence attentional scope, as measured by response preferences on a triad classification task. We predicted that promotion-focused subjects would make more holistic matches than prevention-focused subjects, while prevention-focused subjects would make more analytic matches than promotion-focused subjects. Our predictions were partly confirmed: promotion-focused subjects made a greater proportion of holistic matches compared to prevention-focused subjects. However prevention-focused subjects did not make significantly more analytic matches than promotion-focused subjects.

We found that control condition subjects performed very similarly to subjects in the promotion condition. This most likely reflects the fact that the majority of people in individualistic cultures have a chronic promotion focus (Elliot, Chirkov, Kim & Sheldon, 2001; Lee, Aaker & Gardner, 2000). However because we did not measure subjects’ chronic regulatory focus we cannot go beyond speculation based on our results.

Table 2. Proportion of response types by condition. Standard deviations for these averages are shown in parentheses.

	Holistic	Analytic	Random
Promotion	0.67 (0.30)	0.31 (0.29)	0.02 (0.07)
Prevention	0.49 (0.31)	0.46 (0.31)	0.05 (0.09)
Control	0.65 (0.33)	0.33 (0.31)	0.01 (0.03)

Our results are consistent with prior research that shows that a chronic promotion focus broadens attention (Forster & Higgins, 2005). However the current research used a novel paradigm (triad classification) and manipulated situational regulatory focus instead of measuring chronic regulatory focus. Because we did not measure subjects' chronic regulatory focus we cannot compare our results with those of Memmert et al. (2010), although if the majority of our subjects had a chronic promotion focus it is likely that they experienced a state of regulatory fit when they were in the situational promotion condition and a state of regulatory mismatch when they were in the situational prevention condition, which would mirror their results.

Experiment 1 demonstrated that a promotion focus broadens attention. To test the hypothesis that regulatory fit broadens attention, we used the same regulatory focus manipulation, a triad classification set that has been previously validated for measuring attentional scope, and added a measure of chronic regulatory focus in Experiment 2.

Experiment 2

This experiment was designed to replicate Experiment 1 using an established triad classification task, as well as investigate whether regulatory fit broadens attentional scope compared to regulatory mismatch.

As in Experiment 1, we predicted that subjects in the Promotion condition would make a greater number of holistic matches relative to the Prevention condition and that subjects in the Prevention condition would make a greater number of analytic matches relative to the Promotion condition. Additionally we predicted that if regulatory fit broadens attention, then subjects experiencing a fit between their randomly assigned situational regulatory focus and their measured chronic regulatory focus would make more holistic responses than subjects who experienced a mismatch between their chronic and situational focus.

Method

Subjects Ninety adult undergraduate university students from The University of Western Ontario participated for course credit or for monetary compensation: 44 in the Promotion condition, and 46 in the Prevention condition.

Materials *Triad set.* A set of triads originally created by Kimchi and Palmer (1983) were used. On each trial subjects are shown a target shape with two comparison shapes below it. Subjects were asked which of the two comparison shapes looked most similar to the target shape. One comparison

shape on each trial shared holistic elements with the target while the other comparison shape shared analytic elements with the target. For instance the target shape could be a square made of squares, one comparison shape could be a square composed of smaller triangles (holistic match, see bottom left of Figure 2) and the other comparison shape could be a triangle composed of squares (analytic match, see bottom right of Figure 2). The triad set contained 12 triads of varying compositions and shapes, and these triad sets were also presented with the comparison shapes reversed to prevent subjects from following a predetermined response pattern making 24 triads in total. However while 24 triads were presented to subjects, a subset of 8 triads that have been previously found to be most sensitive to attentional scope were included in our analyses (Fredrickson & Branigan, 2005). An example triad is shown in Figure 2.

Chronic focus measure. The Regulatory Focus Questionnaire (Lockwood, Jordan & Kunda, 2002) was used to measure chronic regulatory focus. This measure has previously been used to study regulatory fit effects (Keller & Bless, 2006; Memmert, Unkelbach & Ganns, 2010). In this measure subjects assign a numeric value alongside 18 questions concerned with promotion and prevention goals. Half of the questions are used to compute a promotion subscale and the other half are used to compute a prevention scale. A measure of chronic 'regulatory strength' can be computed by subtracting the promotion subscale total from the prevention subscale total.

Regulatory focus manipulation. The same regulatory focus manipulation was used as in Experiment 1.

Procedure The same deception as in Experiment 1 was used. All subjects completed the triad classification task after being randomly assigned to one of two situational regulatory focus conditions (promotion, prevention) and completing a measure of their chronic regulatory focus. In both conditions subjects were told that they would be presented with a series of triads on a computer screen. Subjects were informed that there were no incorrect or correct responses, and were instructed to select the comparison shape (A or B) that looked most like the target shape using key presses (two keys were labeled A and B). Triads were self-paced; once students made a classification response via key press they were automatically advanced to the following trial until all of the trials were completed. Triads were presented in a randomized order.

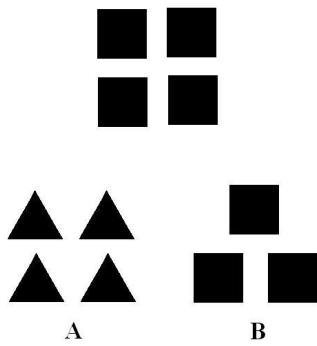


Figure 2: Example triad stimulus used in Experiment 2. The upper shape is the target shape. Selecting A in this case would be considered a holistic match while selecting B would be an analytic match.

Table 3. Regression analysis results. CRS=chronic regulatory strength, SF=situational regulatory focus. The criterion is the proportion of holistic matches on the triad task, ranging from 0 to 1. CRS was centred before entering the analysis to control for effects of multicollinearity. B = regression coefficient, unstandardized and standardized, respectively.

Term	B	SE B	B	t	p
CRS	.002	.002	.098	.948	.346
SF	.033	.002	.118	1.149	.254
CRSxSF	.006	.029	.273	2.662	.009

Results

The proportion of holistic and analytic responses was calculated for each subject by counting the number of each response type and dividing each number by the total number of triads included in the analysis (8). These proportions were averaged within each condition.

An analysis of variance was conducted to see if subjects assigned to the situational promotion condition made more holistic matches ($M = .56$, $sd = .27$) than subjects assigned to the situational prevention condition ($M = .45$, $sd = .29$), but the analysis did not reach significance, $F(1,88) = 3.16$, $p < .08$.

To explore whether subjects made more holistic responses when they experienced a match between their chronic focus and their situational focus (i.e. regulatory fit) than subjects who did not experience a match between their chronic and situational focus, a measure of regulatory focus strength was computed by subtracting the prevention scale scores from the promotion scale scores for each subject. Higher values indicate a stronger promotion focus. The majority of our subjects exhibited a chronic promotion focus ($M = .84$), meaning the promotion scale scores were greater than the prevention scale scores.

We conducted a multiple regression with the proportion of holistic matches used as the criterion variable and situational regulatory focus condition (promotion was coded as 1, prevention as -1), chronic regulatory focus strength,

and the interaction between situational regulatory focus condition and chronic regulatory strength as predictor variables. The results of this analysis are shown in Table 3. The analysis of variance for the regression was significant, $F(3,89) = 3.097$, $p < .05$, meaning the model significantly predicted the data. Main effects of chronic regulatory focus strength and situational regulatory focus did not reach significance. However the interaction between chronic regulatory strength and situational regulatory focus was significant, and the regression weight for the term was positive, indicating that the proportion of holistic responses was greater when the situational regulatory focus manipulation matched the chronic regulatory focus strength. In other words, subjects made more holistic matches when regulatory fit was present. Figure 3 shows a scatterplot of the subject data as well as the linear model fits.

Discussion

We were interested in the effects of regulatory focus and regulatory fit on attentional scope. Unlike Experiment 1, we did not find that the experimental regulatory focus manipulation significantly affected the proportion of holistic triad responses. However when we examined the fit between chronic regulatory focus and the situational regulatory focus manipulation, we found that fit significantly predicted the proportion of holistic matches. This supports the hypothesis that regulatory fit broadens attentional scope. Past research suggests that regulatory fit enhances cognitive flexibility (Grimm, Markman, Maddox, & Baldwin, 2008; Maddox, Baldwin, & Markman, 2006; Markman, Maddox, Worthy, & Baldwin, 2007). Memmert et al. (2010) suggest that the “feeling right” associated with regulatory fit also broadens attention, and our results are consistent with this hypothesis, and extend this research with a previously unused paradigm (triad classification).

An interesting question to consider is whether our Experiment 1 results are also the consequence of regulatory fit and regulatory mismatch, instead of situational regulatory focus. Although we did not measure Experiment 1 subjects’ chronic regulatory focus, it seems likely that the majority of subjects would have responded similarly to our Experiment 2 subjects, with the majority exhibiting a chronic promotion focus. If the majority of subjects placed randomly into a situational promotion focus have a chronic promotion focus, then they would experience regulatory fit and broadened attention, whereas if they were placed into a situational prevention focus condition, they would experience regulatory mismatch and narrowed attention.

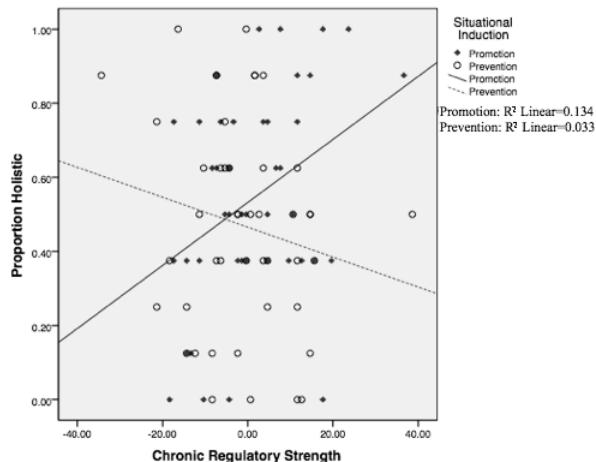


Figure 3: Scatterplot of subject data by situational regulatory focus condition (promotion or prevention). Lines show linear model fits.

Conclusions

Experiment 1 demonstrates that a situational promotion focus broadens attention relative to a situational prevention focus. Experiment 2 demonstrates that when people experience a match between their chronic regulatory focus and situational regulatory focus their attention is wider than when they experience a mismatch. Experiment 2 also suggests that past research that manipulated regulatory focus but did not measure chronic regulatory focus, including our own Experiment 1, may be confounding a promotion focus with regulatory fit.

Future research should see whether similar regulatory fit effects are present in populations where the average person has a chronic prevention focus instead of a chronic promotion focus, such that a situational prevention focus manipulation would broaden attention.

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References

Elliot, A. J., Chirkov, V. I., Kim, Y., & Sheldon, K. M. (2001). A cross-cultural analysis of avoidance (relative to approach) personal goals. *Psychological Science*, 12(6), 505-510.

Förster, J., & Higgins, E. T. (2005). How global versus local perception fits regulatory focus. *Psychological Science*, 16(8), 631-636.

Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, 19(3), 313-332.

Gable, P., & Harmon-Jones, E. (2010). The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity. *Psychological Science*, 21, 211-215.

Grimm, L., Markman, A., Todd Maddox, W., & Baldwin, G. (2008). Differential effects of regulatory fit on category learning. *Journal of Experimental Social Psychology*, 44, 920-927.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52, 1280-1300.

Higgins, E. T. (2000). Making a good decision: Value from fit. *American Psychologist*, 55, 1217-1230.

Higgins, E. T., Roney, C. J. R., Crowe, E., & Hymes, C. (1994). Ideal versus ought predilections for approach and avoidance distinct self-regulatory systems. *Journal of Personality and Social Psychology*, 66, 276-286.

Higgins, E. T., & Spiegel, S. (2004). Promotion and prevention strategies for self-regulation: A motivated cognition perspective. In R. F. Baumeister, & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications*. (pp. 171-187). New York, NY, US: Guilford Press.

Keller, J., & Bless, H. (2006). Regulatory fit and cognitive performance: The interactive effect of chronic and situationally induced self-regulatory mechanisms on test performance. *European Journal of Social Psychology*, 36, 393-405.

Kimchi, R., & Palmer, S. E. (1982). Form and texture in hierarchically constructed patterns. *Journal of Experimental Psychology: Human Perception and Performance*, 8, 521-535.

Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, 83, 854-864.

Maddox, W., Baldwin, G., & Markman, A. (2006). A test of the regulatory fit hypothesis in perceptual classification learning. *Memory & Cognition*, 34, 1377-1397.

Markman, A., Maddox, W., & Baldwin, G. (2007). Using regulatory focus to explore implicit and explicit processing in concept learning. *Journal of Consciousness Studies*, 14, 132-155.

Memmert, D., Unkelbach, C., & Ganns, S. (2010). The impact of regulatory fit on performance in an inattentional blindness paradigm. *Journal of General Psychology*, 137, 129-139.