Emotion

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Affect can influence judgments and decision-making in multiple ways. One way is through (a) integral affect, or affect related to the choice at hand, and another way is through (b) incidental affect, or affect unrelated to the choice at hand. Research suggests integral affect influences risk-related decision-making, especially in the context of risky choice framing. However, the role of affect in other forms of framing (e.g., attribute framing) has received little attention. We examined how integral affect (Study 1) along with incidental affect (Study 2) can alter perceptions of risk and likelihood to take hypothetical medications. Participants read pamphlets about medications with unique side effects presented as a gain (e.g., 86% of people who took this medication did not experience nausea) or loss (e.g., 14% of people who took this medication did experience nausea). Study 2 extended Study 1 by manipulating incidental affect through positive, neutral, and negative affective contexts to examine its impact on subsequent evaluations of framed information. Studies 1 and 2 measured positive and negative feelings about medications, risk perceptions, and likelihood of taking medications. Across both studies, gain-framed attributes led to more positive integral affect, subsequently increasing likelihood to take medications, whereas loss-framed attributes led to more negative feelings and increased perceived riskiness of medications. Study 2 found that positive affective contexts indirectly led to an increased likelihood to take medication by increasing positive feelings about the medications. Taken together, leveraging positivity through gain frames and positive contexts could improve adherence to medication plans.

Keywords: affect, affective contexts, attribute framing, judgment, health decision-making

Human decision-making is fundamentally biased, with one of the most robust biases involving the influence of framed information on judgments and decisions (Kahneman & Tversky, 2000; Tversky & Kahneman, 1981). Framing can take several different forms, and each form is associated with different mechanisms that influence behavior in unique ways (Levin, Schneider, & Gaeth, 1998). Affect is one mechanism that has been able to account for the effect of framing (see, e.g., Cheung & Mikels, 2011; De Martino, Kumaran, Seymour, & Dolan, 2006; Lerner & Keltner, 2001; Stark, Baldwin, Hertel, & Rothman, 2017; Young, Shuster, & Mikels, 2019). Importantly, affect influences judgment and decision-making through different pathways (Lerner, Li, Valdesolo, & Kassam, 2015). The current study investigated the pathways that positive and negative affect can take to influence judgment and decision-making, in the context of attribute framing, and particularly how it can be leveraged to increase the likelihood that people will take medication.

Framing

The "framing effect" was initially examined in studies involving *risky choice framing*, in which people were asked to make a choice between a sure or risky option presented as a gain or a loss (e.g., Tversky & Kahneman, 1981). This research showed that people are more risk avoidant when information is framed in terms of gains (e.g., lives saved), whereas people are more risk seeking when information is framed in terms of loss (e.g., lives lost). Framing has been applied to the health domain through the use of message framing. In particular, researchers have examined how people differentially respond to a loss frame of potentially acquiring an undesirable health outcome, as contrasted with a gain frame of potentially not acquiring the same undesirable outcome (Rothman & Salovey, 1997). Another form of framing, known as *attribute framing*, examines how people evaluate an object depending on how a specific characteristic is described (Levin et al., 1998). For example, when probabilistically equivalent information is presented as a gain (e.g., 90% survival rate for option A), people offer more favorable evaluations compared to when information is presented as a loss (e.g., 10% mortality rate for option A). Recent work has demonstrated that people rate the riskiness of a medication to alleviate severe headaches as less risky when described in terms of the percentage of patients who did not experience a serious side effect versus the equivalent percentage of patients who did (Peters, Hart, & Fraenkel, 2011).

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The effects of framing traditionally have been explained by prospect theory, which describes how people perceive risk according to a value function in which losses have a larger impact than gains (i.e., loss aversion). Therefore, in risky choice framing, loss frames enhance risk seeking through loss aversion (Kahneman & Tversky, 2000). However, as pointed out by Levin et al. (1998), unlike risky choice framing, attribute framing does not involve choosing among different options with varying levels of risk. Levin and colleagues (1998) proposed that the gain frame versus the loss frame in attribute framing focuses people's attention on positive associations resulting in a more positive evaluation. Beyond these considerations, Rothman and Salovey (1997) emphasized the importance of considering the affective state of an individual in addition to their risk perception. Indeed, evidence indicates that the effects of framing are dependent on affective processes (e.g., Cheung & Mikels, 2011; De Martino et al., 2006; Lerner & Keltner, 2001; Stark et al., 2017; Young et al., 2019). However, most of the research on the role of affect in framing has focused on risky choice framing.

Affect and Its Role in Framing

Affect is known to play an important role in judgment and decision-making (Lerner et al., 2015; Loewenstein, Weber, Hsee, & Welch, 2001; Slovic, Finucane, Peters, & MacGregor, 2007). Affect is often used as an information processing heuristic that guides decision-making and judgments of risks and benefits: the *affect heuristic* (Finucane, Alhakami, Slovic, & Johnson, 2000; Slovic et al., 2007). When feeling good, people make more optimistic judgments, and when feeling bad, they make more pessimistic judgments (e.g., Edmans, García, & Norli, 2007; Han, Lerner, & Keltner, 2007; Hirshleifer & Shumway, 2003; Kamstra, Kramer, & Levi, 2003; Keltner & Lerner, 2010; Loewenstein & Lerner, 2003).

Affect can influence judgments and decision-making in multiple ways (Lerner et al., 2015; Peters, Lipkus, & Diefenbach, 2006). One route is associated with affect unrelated to the judgment or decision at hand: *incidental affect* (Lerner et al., 2015). Incidental affect has been shown to carry over from one situation to another and influence decisions that should not normatively be related to the decisions in the new situation (e.g., Dorison et al., 2020; Lerner et al., 2015). Carryover of incidental affect introduces bias as research has found that people offer more optimistic judgments when in a good mood and more pessimistic judgments when in a bad mood (Han, Lerner, & Zeckhauser, 2012; Keltner & Lerner, 2010; Loewenstein & Lerner, 2003). For example, using a classic risky choice framing task, Lerner and Keltner (2001) examined the influence of people's dispositional affect on the framing effect and found that fearful individuals showed risk aversion, whereas angry individuals showed risk seeking. In contrast, Cassotti and colleagues (2012) used a gambling task to examine the effects of experimentally induced negative and positive emotional contexts on the framing effect. Though they found no effect of a negative context on the framing effect, they did find that a positive context eliminated the framing effect through reduced risk seeking in loss frames, which is consistent with other findings of positive affect leading to risk aversion (Isen & Geva, 1987; Isen & Patrick, 1983). Cassotti and colleagues (2012) interpreted their findings as indicating that positive affect influences people to focus on gains, thus reducing the impact of potential losses. In the context of attribute framing, positive compared to negative moods have been found to elicit more favorable thoughts of gain-framed attributes, ultimately leading to an increased persuasiveness of positive attributes (Putrevu, 2014).

A second route affect can take to influence judgments and decision-making is associated with affect that is about, or the result of, the judgment or choice at hand: *integral affect* (Lerner et al., 2015). For example, in the context of risky choice framing, integral affect has been shown to guide preferences for sure and risky choices (see, e.g., Stark et al., 2017; Young et al., 2019). Moreover, within risky choice framing, integral affect better predicts risk preferences than incidental affect (Young et al., 2019). However, these integral and incidental affect findings have not yet been examined in the context of attribute framing. Moreover, the same pattern of findings may not apply to attribute framing. Attribute framing is not necessarily influenced by complex comparisons involving loss aversion but instead more simply involves reactions to the framing of the attribute (Levin et al., 1998). As such, affect may play a prominent role in attribute framing, regardless of the incidental or integral pathway.

The following two studies examined how attribute framing and affective contexts can be leveraged to manipulate integral and incidental affect, subsequently influencing risk perceptions and the likelihood of taking medications. Study 1 used attribute framing to manipulate characteristics of four different types of medication to examine how integral feelings influence risk perceptions and the likelihood of taking the medications. Study 2 built upon Study 1 by incorporating a manipulation of the affective context during the attribute framing paradigm to simultaneously manipulate incidental and integral affect.

Study 1

The goal of Study 1 was to explore how integral affect influences perceptions of risk and likelihood to take a hypothetical medication used to treat common health issues. Participants were presented with four health pamphlets containing information such as causes of, symptoms of, and remedies for allergies, migraines, insomnia, and digestion problems and related hypothetical medications. Each hypothetical medication had three unique side effects with varying probabilities of experiencing a particular side effect. For each side effect, participants evaluated how risky the medication was to take, how positive and negative they felt toward the side effect information (i.e., integral affect), and their likelihood of taking the medication. General risk-taking behavior in daily life, numeracy ability, and state affect were also measured to control for any differences between the gain- and loss-frame conditions. We predicted that compared to loss-framed attributes, gain-framed attributes would lead to more positive affect and thus a greater likelihood to take the medication. Moreover, we predicted that compared to gain-framed attributes, loss-framed attributes would lead to more negative affect and subsequently greater perceptions that the medication was risky.

Method

Participants. One hundred sixteen undergraduate students (75% female; age range: 18–27, *M* age = 19.52, *SD* = 1.97; 75%

indicated their race as Caucasian; 48.7% reported having allergies, 14.9% reported having migraines, 12.6% reported having digestive problems, 7.41% reported having insomnia) were recruited online through DePaul University's research participation system. Participants were granted course credit as compensation for completing this 30-min survey. A power analysis conducted using G-Power indicated that a sample size of 128 with two groups (gain and loss frame) would be required to detect a medium effect size ($d = 0.5$) with 80% power at an alpha level of 0.05. Data collection ceased when 130 responses were submitted. This study was approved by DePaul University's institutional review board. It was decided a priori that participants who failed at least one of the two attention checks ($n = 5$), who were older 30 years old ($n = 4$), and who did not complete the survey ($n = 5$) would be dropped from analyses, resulting in a total sample size of 116. A post hoc power analysis indicated that 116 participants would be sufficient to medium effects ($d = 0.5$), with a power of 75% at an alpha level of .05. Table 1 includes participants' ages and means for the individual difference measures, four dependent variables of interest, and the test statistics for differences by frame. All data and materials for Study 1 and Study 2 can be found at https://doi.org/10.17605/OSF.IO/AE3ZM.

Stimuli and materials.

Framing task. The framing task used in the present study was adapted from Peters and colleagues (2011), in which participants imagined that they suffered from debilitating headaches and were asked to make evaluations about a medication's perceived riskiness to treat the headaches. In the current study, participants were presented with pamphlets regarding four common health issues: migraines, insomnia, allergies, and digestive problems. Each pamphlet provided general information about the health issue, such as causes and symptoms, and a hypothetical medication containing three unique side effects. The general information for each pamphlet was worded in a neutral manner and kept identical across both framing conditions. However, the attributes of the three unique side effects for each medication were manipulated to focus on the probability of not experiencing a negative side effect versus the probability of experiencing a negative side effect. The probability of experiencing each side effect varied by frame condition but were probabilistically equivalent across framing conditions. For example, in the gain-frame condition, participants saw "78% of people who took the medication *did not* experience dizziness." In the loss-frame condition, participants saw "22% of people who took the medication *did* experience dizziness." To ensure variability across and within the four pamphlets, the percentages were arbitrary and ranged from 2−35% for the loss frame and 65−98% for the gain frame. For allergies, the three unique side effects of the medication included dry mouth, nausea, and blurred vision. For digestive problems, the three unique side effects of the medication were headaches, rash outbreaks, and dizziness. For migraines, the three unique side effects of the medication included difficulty keeping balance, difficulty sleeping, and excessive sweating. For insomnia, the three unique side effects of the medication were attention and memory problems, heartburn, and diarrhea. Two attention checks were included in the framing task to ensure that participants were paying attention to the task.

Attention check. Participants completed two attention checks. Participants responded to these questions on a 7-point scale (1 = *not at all*, 7 = *extremely*). For the first attention check, participants were instructed to select *not at all*. For the second attention check, participants were instructed to select *extremely*.

Integral affect. After each side effect, participants were asked "How *positively* do you feel about this medication?" ($\alpha = .91$) and "How *negatively* do you feel about this medication?" ($\alpha = .89$). Participants responded to these questions on a 7-point scale (1 = *not at all*, 7 = *extremely*). The positive and negative integral feelings toward the medications were calculated by averaging across the 12 positive and negative ratings, respectively (4 pamphlets × 3 side effects = 12 total).

Risk perception of the medication. After each side effect, participants were asked "How *risky* do you think this medication is?" ($\alpha = .89$). Participants responded to this question on a 7-point scale (1 = *not at all*, 7 = *extremely*). The risk perceptions of the medications were calculated by averaging across the 12 risk perception ratings.

Likelihood to take the medication. After each side effect, participants were asked "How *likely* are you to take this medication?" ($\alpha = .93$). Participants responded to this question on a 7-point scale (1 = *not at all*, 7 = *extremely*). Participants' likelihood of taking the medications was calculated by averaging across the 12 likelihood ratings.

Risk-taking behavior. The Domain-Specific Risk-Taking (DOSPERT) scale developed by Blais and Weber (2006) is a 30-item questionnaire assessing individuals' risk-taking behavior

Table 1
Means, Standard Deviations, and Significance Tests for Control and Dependent Variables for Study 1

	Gain		Loss		Comparison		
Variable	*M*	*SD*	*M*	*SD*	*t*	*p*	Cohen's *d*
Age	19.46	1.80	19.58	2.14			
Numeracy	8.58	2.08	8.18	2.29	$t(114) = -0.99$	.326	−0.18
DOSPERT	3.09	0.66	2.98	0.56	$t(114) = -1.02$	.308	−0.19
Positive state affect	2.57	0.81	2.75	0.79	$t(114) = 1.17$	.244	0.22
Negative state affect	1.60	0.60	1.61	0.56	$t(114) = .10$	.925	0.02
Perceived risk	2.84	0.73	3.67	0.98	$t(114) = 5.19$	<.001	0.96
Positive feelings	3.74	0.98	3.04	1.03	$t(114) = -3.71$	<.001	−0.69
Negative feelings	2.84	0.82	3.89	0.97	$t(114) = 6.30$	<.001	1.17
Likelihood	3.50	1.16	2.99	1.25	$t(114) = -2.32$	.034	−0.43

Note. DOSPERT = Domain-Specific Risk-Taking scale.

(sample $\alpha = .78$). This scale can be broken down into five domains: financial decisions (e.g., betting a day's income at a high-stakes poker game; sample $\alpha = .62$), recreational (e.g., going whitewater rafting at high water in the spring; sample $\alpha = .79$), health/safety (e.g., drinking heavily at a social function; sample $\alpha = .54$), ethical (e.g., taking some questionable deductions on your income tax return; sample $\alpha = .42$), and social decisions (e.g., speaking your mind about an unpopular issue in a meeting at work; sample $\alpha = .69$). Participants responded to each item on a 7-point scale (1 = *extremely unlikely*, 7 = *extremely likely*). Scores were averaged within each domain to create separate subscale scores, with higher scores indicating a greater likelihood to engage in risky behavior for each specific subscale. Reliability analyses from the present study were worse across subscales compared to the originally reported scale reliabilities (α ranged from .71 to .86; Blais & Weber, 2006).

Numeracy. The numeracy measure developed by Lipkus, Samsa, and Rimer (2001) is an 11-item questionnaire that includes two multiple-choice and nine open-ended questions assessing individuals' ability to interpret probability and numerical concepts ($\alpha = .78$; Lipkus et al., 2001). The scale assessed how well participants were able to differentiate and compute simple mathematical operations on risk magnitudes using percentages and proportions, convert percentages to proportions, convert proportions to percentages, and convert probabilities to proportions. The number of correct responses were added to create a total numeracy ability score (sample $\alpha = .49$).

State affect. Current state affect was measured using the Modified Differential Emotions Scale (mDES) developed by Fredrickson, Tugade, Waugh, and Larkin (2003). The 19-item scale assessed experiences of 10 discrete positive emotions (e.g., amusement, compassion, awe, contentment, gratitude, hope, love, pride, joy, and interest; $\alpha = .79$) and nine discrete negative emotions (e.g., fear, guilt, sadness, anger, surprise, shame, contempt, embarrassment, and disgust; $\alpha = .69$; Fredrickson et al., 2003). Participants were asked to indicate how much of each emotion they feel right now, that is, at the present moment, on a 5-point scale (1 = *not at all*, 5 = *extremely*). Separate aggregate subscales for positive (sample $\alpha = .88$) and negative (sample $\alpha = .71$) emotions were created by averaging the scores for positive and negative emotions independently.

Procedure. Prior to the study, participants were randomly assigned to either the gain-frame or loss-frame condition. After providing informed consent, participants completed the measure of current state affect (mDES). Participants were then told that they would be presented with health pamphlets about hypothetical medications used to treat common health issues with different side effects. Within each frame, the presentation order of the pamphlets was randomized. Within each pamphlet, the presentation order of the side effects was randomized. After viewing the first general page of the pamphlet that contained the general information and the three side effects, participants evaluated each side effect's perceived riskiness, how positively they felt about the medication, how negatively they felt about the medication, and how likely they were to take the medication. The first three questions were randomly presented to the participant, but the participants always indicated their likelihood to take the medication last. This order was chosen because it was important for the participants to consider the medication's perceived risk and their affective reactions to the medication prior to reporting their willingness to take it. After the framing task, participants completed the DOSPERT, the numeracy measure, and a demographic questionnaire obtaining information about age, gender, birth date, education level, income level, employment status, and whether or not they have been diagnosed with insomnia, allergies, migraines, and digestive problems. Upon completion, participants were thanked and compensated for their participation.

Results

Analyses were conducted using the software R (R Core Team, 2019). As reported in Table 1, no significant group differences by frame emerged for the control variables (i.e., DOSPERT, numeracy ability, and state affect), suggesting that any difference observed for the evaluation of the medication was driven by the effect of frame. To determine whether frame had an effect on positive affect, negative affect, risk perception, and likelihood to take the medication, we conducted separate independent-samples *t* tests. We then examined if the influence of frame on perceived riskiness and likelihood to take the medication could be explained by integral feelings toward the medication.

The effect of frame. Participants in the gain frame reported more positive feelings about the medication ($M = 3.74$, $SD = 0.98$) than did those in the loss frame ($M = 3.04$, $SD = 1.03$), $t(114) = -3.71$, $p < .001$. Similarly, participants in the loss frame reported more negative feelings about the medication ($M = 3.99$, $SD = 0.97$) than did those in the gain frame ($M = 2.84$, $SD = 0.82$), $t(114) = -6.30$, $p < .001$. The loss frame was associated with greater perceived risk ($M = 3.67$, $SD = 0.98$) compared to the gain frame ($M = 2.84$, $SD = 0.73$), $t(114) = 5.18$, $p < .001$. Last, the gain frame was associated with an increased likelihood to take the medication ($M = 3.50$, $SD = 1.16$) compared to the loss frame ($M = 2.99$, $SD = 1.25$), $t(114) = -2.32$, $p < .05$.

Mediation analyses. Two separate mediation analyses were conducted to examine the effect of frame on the risk perceived in taking the medication and the likelihood to take the medication. Data were analyzed using the lavaan package (Rosseel, 2012). Because research has found that affect influences risk perception (Slovic et al., 2007), we wanted to first account for the mediating role of integral affect in frame's relationship to risk perception. The first medication model accounted for the effect of frame on risk perception using positive and negative integral feelings as mediators. Next, we implemented our complete mediation model to examine frame's relationship to likelihood to take the medication. This mediation model accounted for the effect of frame on likelihood to take the medication using positive and negative integral feelings and risk perception as mediators. For these models, frame was regressed on each possible mediator in each model, respectively. Then, each mediator and frame was regressed on the outcome. Finally, using the method outlined by Hayes (2009), each estimate of the causal mediation effect (indirect effect: IE) was computed for each of 5,000 bootstrapped samples. The 95% confidence interval was computed from the indirect effect at the 2.5% and 97.5% percentiles for each mediator. Tables 2 and 3 contain the results from the analysis for predicting perceived risk and likelihood to take the medication, respectively, with the mean estimates for the direct effects being consistent with the results of the *t* tests described previously.

Table 2
Results From Mediation Analysis With Perceived Riskiness as the Outcome Variable for Study 1

Effect	Outcome	Predictor	β	*SE*	*p*	CI lower	CI upper
Direct effects	Perceived risk	Frame	−0.04	0.10	.697	−0.23	0.15
		Positive feelings	0.04	0.04	.374	−0.04	0.12
		Negative feelings	0.85	0.05	<.001	0.76	0.94
	Positive feelings	Frame	−0.70	0.19	<.001	−1.05	−0.33
	Negative feelings	Frame	1.05	0.17	<.001	0.73	1.37
Indirect effects	Perceived risk	Frame via positive feelings	−0.03	0.03	.387	−0.08	0.03
		Frame via negative feelings	0.89	0.16	<.001	0.60	1.18
Total effects			0.83	0.16	<.001	0.51	1.15

Note. *SE* = standard error; CI = confidence interval.

Risk perception. This model was specified by placing perceived riskiness as the outcome variable and frame, positive feelings, and negative feelings as the predictor variables, with positive and negative feelings mediating the effect of frame on risk perception. The results indicated that the influence of frame on perceived riskiness was partially mediated by negative feelings about the medication (IE: $\beta = 0.892$, $p < .001$). This suggests that frame influenced how risky the medication was perceived and that this was partially accounted for by negative feelings about the medication. There was a significant total effect of frame given these designated pathways ($\beta = 0.829$, $p < .001$).

Likelihood to take the medication. This model was specified by placing likelihood to take the medication as the outcome variable and frame, positive feelings, negative feelings, and perceived riskiness as the predictor variables. Positive feelings, negative feelings, and perceived riskiness were included as mediators of the effect of frame on the likelihood to take the medication. The results indicated that frame influenced the likelihood to take the medication through the positive feelings about the medication (IE: $\beta = -0.578$, $p < .001$). This suggests that framing influenced how likely a person is to take a medication and that this effect is partially explained by how positively a person feels toward the medication. There was a significant total effect of frame given the designated pathways ($\beta = -0.524$, $p = .011$).

Discussion

Study 1 investigated the differential impact of gain and loss framing on the evaluations of four medications' perceived risk, integral positive and negative affective reactions toward the medication, and the likelihood to take the medication. The gain frame was associated with more positive integral feelings about the medication, less negative integral feelings, less perceived risk, and an increased willingness to take the medication relative to the loss frame. Interestingly, the mediation analyses provided more insight into the possible mechanisms of how frame influences perceived risk and likelihood to take the medication. Specifically, it appears that negative feelings about the medication are important in determining a medication's perceived risk, whereas positive feelings are important for determining whether or not one would take the medication. These findings highlight the important role of considering integral affect in attribute framing. Moreover, they suggest that attribute framing could be a powerful way to increase the adherence of medication regimens by leveraging positive integral affect.

Taken together, integral affect appears to serve an important role in how medications are evaluated in terms of risk and likelihood to take them. However, given the importance of incidental affect in the effects of framing (Cassotti et al., 2012; Lerner & Keltner,

Table 3
Results From Mediation Analysis With Likelihood as the Outcome Variable for Study 1

Effect	Outcome	Predictor	β	*SE*	*p*	CI lower	CI upper
Direct effects	Likelihood	Frame	0.29	0.16	.075	−0.03	0.60
		Positive feelings	0.84	0.07	<.001	0.71	0.97
		Negative feelings	−0.06	0.15	.681	−0.36	0.23
		Perceived risk	−0.20	0.15	.202	−0.51	0.11
	Perceived risk	Frame	−0.04	0.10	.697	−0.23	0.15
		Positive feelings	0.04	0.04	.374	−0.04	0.12
		Negative feelings	0.85	0.05	<.001	0.76	0.94
	Positive feelings	Frame	−0.69	0.19	<.001	−1.05	−0.33
	Negative feelings	Frame	1.05	0.17	<.001	0.73	1.37
Indirect effects	Likelihood	Frame via positive feelings	−0.58	0.16	<.001	−0.89	−0.26
		Frame via negative feelings	−0.07	0.16	.682	−0.38	0.25
		Frame via perceived risk	0.00	0.01	.777	−0.01	−0.01
		Frame via positive feelings via risk	0.01	0.16	.474	−0.45	0.02
		Frame via negative feelings via risk	−0.18	0.14	.212	−0.45	0.10
Total effects			−0.81	0.18	<.001	−1.17	−0.46

Note. *SE* = standard error; CI = confidence interval.

2001), the role of incidental affect remains unclear. Does incidental affect play a role in combination with integral affect to inform attribute judgments? Or does it play a separate independent role? Given that attribute framing relative to risky choice framing may be more influenced by affect, it is important to examine how both integral and incidental affect simultaneously influence judgments and evaluations of attributes.

Study 2

The goal of Study 2 was to replicate and extend Study 1. This study examined how attribute framing, in combination with an affective context, manipulates both integral and incidental affect. Moreover, it explored how these affective pathways guide risk perceptions and the likelihood to take medications. As discussed previously, affect can drive optimistic and pessimistic ways of judging and making decisions. Positive affect typically signals that "all is well," leading to a more optimistic way of processing of information (Slovic et al., 2007). Negative affect, on the other hand, typically signals that all is not well and therefore more pessimistic ways of processing information (Slovic et al., 2007). The present study examined if incidental affect alters how people evaluate framed attributes and if positive versus negative incidental affect leads to an increase and/or decrease in frame-related biases when evaluating medications.

In order to manipulate incidental affect in the same paradigm measuring integral affect, Study 2 introduced affective contexts for the attribute framing task by using affective images from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999). Using the same pamphlets and framing manipulation as Study 1, we used affect-eliciting images to create an affective context (positive, neutral, negative) before each pamphlet to evoke incidental affect. It was hypothesized that similar framing effects would emerge in Study 2 as in Study 1. We predicted that the gain frame would lead to more positive feelings about the medication and thus an increased willingness to take the medication. Conversely, we predicted that the loss frame would lead to more negative feelings about the medication and thus increase the medication's perceived risk. For the affective context manipulation, we hypothesized that a main effect of affective context would emerge such that more positive affective context would lead to more positivity, less negativity, reduced risk perception, and an increased likelihood to take the medications compared to both the neutral and negative context.

Moreover, two competing hypotheses were generated about the potential interaction between affective context and frame condition. The first hypothesis posited that affective context could both create and remove a "rose-colored glasses" effect depending on the frame. Specifically, a positive affective context, relative to a neutral and negative affective context, may eliminate differences in negativity between the gain and loss frame such that a positive affective context creates rose-colored glasses for the loss frame. Moreover, a negative affective context, relative to a positive and neutral affective context, may eliminate differences in positivity between gain and loss frames such that a negative affective context removes the rose-colored glasses for the gain frame. In other words, affective context may negate the influence of the attribute frame on integral affect and subsequently eliminate differences in risk perception and likelihood to take the medications. The second rival hypothesis posited that when an affective context and frame are congruent (e.g., positive/gain as congruent vs. positive/loss as incongruent), integral affect toward the medication will be enhanced. Relatedly, a congruent affective context and frame will lead to an even lesser (or greater for negative congruent) level of risk perception and greater (or lesser for negative congruent) likelihood to take the medication. If neither interaction emerges but both main effects are found, a model in which incidental and integral affect are independent rather than interdependent affective pathways that influence judgments and decision-making would be supported.

Method

Participants. Two hundred eighty-four younger adults (31.9% female; age range: 19–30, *M* age = 24.65, *SD* = 2.11; 65% indicated their race as Caucasian; 50% reported having allergies, 14.5% reported having migraines, 18.8% reported having digestive problems, 15.9% reported having insomnia), were recruited through Amazon Mechanical Turk and paid $3 for completing this 30-min survey. For Study 2, we wanted a more diverse and representative sample in order to extend the generalizability of our findings beyond an undergraduate sample. To determine the number of participants for the present study, a power analysis was conducted based upon a 2 × 3 between-subjects analysis of variance (ANOVA). Given the effects of Study 1, this analysis conservatively estimated the required sample size using the following parameters: detecting small to medium effects ($f = 0.20$) with 80% of power at an alpha level of 0.05, numerator degrees of freedom = 2, and number of groups = 6. The results of this analysis indicated that 244 total participants were needed to detect small to medium effects for our study. Anticipating that some participants would have to be dropped from analyses for failing at least one attention check as well as the desire to maximize power, we recruited a total of 326 participants. Study 2 adopted the same exclusion criteria as Study 1. Given these criteria, a total of 42 participants were dropped from the analyses, leaving a total of 284 participants for our final sample. Table 4 contains means and standard deviations for the following measures: risk taking, current state affect, numeracy ability, risk perceptions, positive and negative feelings about the medication, and likelihood to take the medication. This study was approved by DePaul University's institutional review board (JM051415PSY).

Stimuli and materials.

Framing task. The same framing task was used in Study 2 as in Study 1. This includes the same measures of positive (sample $\alpha = .94$) and negative affect (sample $\alpha = .92$), risk perception (sample $\alpha = .92$), and likelihood to take the medication (sample $\alpha = .94$). However, we added pictures prior to each pamphlet to create different incidental affective contexts.

Affective context. To create incidental positive, negative, and neutral contexts, 12 positive, negative, and neutral images each (36 total) were selected from the IAPS (Lang, Bradley, & Cuthbert, 1999) to be presented to participants. These images were selected based upon a validation study of the valence and arousal level that these images evoke in people (Lang et al., 1999). To create each type of affective context, the ratings of the images' valence and arousal were averaged to ensure that each condition was represented by the correct level of positivity and negativity. For valence

Table 4
Means and Standard Deviations for Control and Dependent Variables by Frame and Affective Context in Study 2

Variable	Neutral		Positive		Negative	
	Gain (n = 49) *M (SD)*	Loss (n = 46) *M (SD)*	Gain (n = 48) *M (SD)*	Loss (n = 45) *M (SD)*	Gain (n = 48) *M (SD)*	Loss (n = 48) *M (SD)*
Age	24.39 (2.23)	24.50 (2.18)	24.58 (2.00)	24.69 (1.95)	24.50 (2.08)	24.60 (1.99)
Numeracy	9.08 (2.24)	8.65 (1.93)	8.98 (2.56)	8.93 (2.14)	9.27 (1.50)	9.06 (2.18)
DOSPERT	3.37 (1.31)	3.23 (1.09)	3.70 (1.05)	3.26 (1.13)	3.17 (1.06)	3.35 (1.10)
Positive state affect	2.64 (0.97)	2.60 (0.97)	2.79 (1.01)	2.84 (1.11)	2.73 (1.10)	2.53 (0.90)
Negative state affect	1.83 (0.95)	1.56 (0.62)	1.77 (0.94)	1.73 (0.86)	1.61 (0.75)	1.68 (0.79)
Perceived risk	3.30 (1.51)	3.31 (0.91)	3.29 (1.30)	3.49 (0.83)	3.03 (1.10)	3.62 (1.10)
Positive feelings	3.68 (1.56)	2.68 (0.98)	4.13 (1.36)	3.11 (1.09)	3.35 (1.26)	2.93 (1.03)
Negative feelings	3.19 (1.46)	3.31 (0.89)	3.12 (1.38)	3.48 (0.91)	2.98 (1.15)	3.64 (1.13)
Likelihood	3.71 (1.59)	2.87 (1.12)	4.00 (1.43)	3.26 (1.06)	3.42 (1.26)	3.14 (1.20)

Note. DOSPERT = Domain-Specific Risk-Taking scale.

ratings, the negative set (M = 2.27, SD = 0.53) did differ significantly from the neutral set (M = 5.01, SD = 0.04), $t(22) = -17.67$, $p < .001$, $d = -7.21$, as well as from the positive set (M = 7.89, SD = 0.26), $t(22) = -32.90$, $p < .001$, $d = -13.43$. The positive set and neutral set also differed significantly, $t(22) = -38.75$, $p < .001$, $d = -15.82$. For arousal ratings, the negative set (M = 4.83, SD = 0.79) differed significantly from the neutral set (M = 2.71, SD = 0.43), $t(22) = 8.16$, $p < .001$, $d = 3.33$, but the negative set did not differ significantly from the positive set. The positive set (M = 4.53, SD = 0.89) and the neutral set did significantly differ in arousal, $t(22) = -6.40$, $p < .001$, $d = -2.61$.

Individual difference measures. Similar to Study 1, measures of risk taking (i.e., the DOSPERT), state affect (i.e., mDES), and numeracy ability also were used in Study 2 as control variables. The reliability analyses for the DOSPERT total (sample α = .94) and all subscales of recreational (sample α = .83), social (sample α = .78), health and safety (sample α = .80), ethical (sample α = .87), and financial decisions (sample α = .85) were much higher compared to Study 1. Likewise, reliability was much higher for positive state affect (sample α = .92) and negative state affect (sample α = .92) as well as numeracy ability (sample α = .73) in Study 2 compared to Study 1.

Procedure. The procedure for Study 2 was similar to Study 1. Participants were randomly assigned to a frame condition (gain, loss; between-subjects factor) and an affective context condition (positive, negative, neutral; between-subjects factor). After obtaining informed consent, participants completed the state affect measure. Next, participants were informed that they would be presented with health pamphlets describing medications for common health issues. Participants were informed that before each pamphlet, pictures would be shown briefly to them and that they would be responding to questions about these images. In addition, the participants were told that they would be asked to recall the images at the end of the study. This was done so that participants would devote more effort in evaluating the images. Depending on the affective context condition to which the participant was assigned, three IAPS images that were either negative, neutral, or positive in nature (3 per pamphlet × 4 pamphlets = 12 images in total) were presented to the participant prior to viewing a pamphlet. Each image was presented for 5 s. After each image, participants indicated how positively (sample α = .98) and how negatively (sample α = .98) they felt about the image they just saw on a Likert-type scale of 1 (*not at all*) to 7 (*extremely*).

As in Study 1, participants rated their positive and negative feelings toward the attribute-framed side effects, perceived riskiness of the medication, and likelihood to take the medication. After all four pamphlets were presented, the DOSPERT and numeracy measures were completed. Next, participants completed the IAPS image recall test, during which participants were presented with two images they had seen previously and two images they had not seen previously. Participants indicated whether or not they had seen the image before (yes/no response). Responses on the recall test were not analyzed as they served as a cover story to the participants to attend to the IAPS images per our manipulation. After the recall test, participants completed the same demographic questions as used in Study 1. After the demographic questionnaire, participants were thanked and compensated for their participation.

Results

Analyses were conducted using R (R Core Team, 2019). We analyzed the positive and negative ratings for the IAPS images that were presented before each health pamphlet to ensure that our incidental affect manipulation worked, which were analyzed using a one-way ANOVA with affective context: positive, negative, neutral. The control variables and the four dependent variables of interest were analyzed using a 2 (Frame: gain, loss) × 3 (Affective Context: positive, negative, neutral) between-subjects ANOVA. Follow-up post hoc Tukey's honest significant difference (HSD) tests were conducted to examine any significant effect of affective context and frame for all dependent variables tested. Additionally, we wanted to determine if the influence of affective context and frame on the likelihood to take the medication and the perceived riskiness could be explained by integral affect (i.e., the positive and negative feelings about the medication) using two separate mediation analyses.

Manipulation check: Affective contexts. For positive ratings of images, a one-way ANOVA revealed significant differences between affective contexts, $F(2, 279) = 214.14$, $p < .001$. Tukey's HSD tests revealed that all three contexts were significantly different from each other. The positive context condition (M = 5.43, SD = 1.36) had significantly higher positive ratings than the negative context condition (M = 1.50, SD = 0.88),

$t(187) = -23.69$, $p < .001$, $d = -3.49$, and the neutral context condition ($M = 2.90$, $SD = 1.61$), $t(186) = -11.54$, $p < .001$, $d = -1.68$. Furthermore, the neutral context was more positive than the negative context, $t(189) = -7.51$, $p < .001$, $d = -1.09$. For negative ratings of images, a one-way ANOVA revealed significant differences between contexts, $F(2, 279) = 255.931$, $p < .001$. Tukey's HSD tests revealed that the negative context ($M = 5.91$, $SD = 1.26$) had significantly greater levels of negativity compared to the positive ($M = 1.73$, $SD = 1.23$), $t(187) = 20.39$, $p < .001$, $d = 2.98$, and neutral contexts ($M = 2.00$, $SD = 1.24$), $t(189) = 18.20$, $p < .001$, $d = 2.63$. The positive and neutral contexts did not differ significantly in how negatively the images were rated. These analyses verified that our incidental affect manipulation was indeed successful.

The effects of frame and condition.

Positive feelings. The ANOVA examining the effect of frame and affective context on positive feelings toward the medications revealed a main effect of frame, $F(1, 279) = 31.41$, $p < 001$, $\eta_p^2 = 0.101$, and a main effect of affective context, $F(2, 279) = 4.22$, $p = .016$, $\eta_p^2 = 0.029$, but neither main effect was qualified by an interaction. Participants reported more positive feelings about the medication in the gain frame ($M = 3.73$, $SD = 1.44$) than those in the loss frame ($M = 2.91$, $SD = 01.04$). Follow-up Tukey's HSD tests indicated that the positive affective context led to significantly more positive feelings about the medication ($M = 3.64$, $SD = 1.70$) than did the negative ($M = 3.17$, $SD = 1.20$) or neutral affective context ($M = 3.20$, $SD = 1.40$), which did not differ significantly from each other. Thus, the results indicate that the affective context and frame function independently to manipulate positive affect toward the medications.

Negative feelings. The ANOVA examining the effect of frame and affective context on negative feelings about the medication revealed a main effect of frame only, $F(1, 279) = 7.70$, $p = .006$, $\eta_p^2 = 0.027$. Participants reported more negative feelings about the medication in the loss frame ($M = 3.48$, $SD = 1.09$) than in the gain frame ($M = 3.09$, $SD = 1.33$). Affective context did not affect negative feelings about the medication's attributes, but frame did.

Risk perception. The ANOVA examining the effect of frame and affective context on perceived riskiness revealed a main effect of frame only, $F(1, 279) = 4.051$, $p = .045$, $\eta_p^2 = 0.014$, such that the loss frame was associated with greater perceived riskiness ($M = 3.48$, $SD = 0.96$) than the gain frame ($M = 3.20$, $SD = 1.31$). Affective context did not have a main effect, and the interaction between frame and affective context was not found to be statistically significant.

Likelihood to take the medication. The ANOVA examining the effect of frame and affective context on the likelihood to take the medications revealed a main effect of frame only, $F(1, 279) = 17.16$, $p < .001$, $\eta_p^2 = 0.058$. The gain frame was associated with an increased willingness to take the medication ($M = 3.73$, $SD = 1.45$) compared to the loss frame ($M = 3.09$, $SD = 1.13$). Affective context did not affect likelihood to take the medication and did not interact with frame.

Mediation analysis. Data were analyzed using the same procedure as Study 1. However, Study 2 included affective context as an additional variable in the mediation models. Affective context's influence on perceived risk and likelihood to take the medication was examined using the same mediation pathways as frame for both mediation models. Tables 5 and 6 contain the results from the mediation analyses.

Risk perception. For the first mediation analysis, frame, affective context, positive feelings, and negative feelings were regressed on risk perceptions. This analysis examined if frame and affective context indirectly influenced risk perceptions via positive and negative feelings about the medications. The mediation analysis revealed that the influence of frame and affective context on the medications' perceived riskiness was partially accounted for by the integral affect measures. The influence of frame on risk perception was partially accounted for by positive feelings about the medication (IE: $\beta = -0.09$, $p < .001$) as well as negative feelings about the medication (IE: $\beta = 0.35$, $p = .005$). Gain frames increased positive feelings about the medications, which in turn reduced risk perceptions of the medication. In contrast, loss frames increased negative feelings about the medication, which in turn increased risk perceptions of the medications. Although affective context did not directly influence risk perception, it did indirectly influence risk perception by influencing positive feelings about the medication (IE: $\beta = 0.024$, $p = .029$). Positive affective contexts led to greater levels of positive affect toward the medications, which partially explained the decrease in risk perceptions of the

Table 5
Results From Mediation Analysis With Perceived Risk as the Outcome Variable for Study 2

Effect	Outcome	Predictor	β	*SE*	*p*	CI lower	CI upper
Direct effects	Perceived risk	Frame	0.02	0.06	.772	−0.10	0.13
		Affective context	0.00	0.03	.990	−0.07	0.07
		Positive feelings	0.11	0.02	<.001	0.07	0.15
		Negative feelings	0.90	0.02	<.001	0.85	0.94
	Positive feelings	Frame	−0.83	0.15	<.001	−1.12	−0.54
		Affective context	0.22	0.09	.015	0.04	0.40
	Negative feelings	Frame	0.39	0.14	.005	0.12	0.66
		Affective context	0.02	0.09	.816	−0.15	0.19
Indirect effects	Perceived risk	Frame via positive feelings	−0.09	0.02	<.001	−0.14	−0.04
		Frame via negative feelings	0.35	0.13	.005	0.10	0.59
		Affective context via positive feelings	0.02	0.01	.029	0.00	0.05
		Affective context via negative feelings	0.02	0.08	.816	−0.13	0.17
Total effects		Frame	0.28	0.14	.045	0.01	0.54
		Affective context	0.04	0.08	.621	−0.12	0.21

Note. *SE* = standard error; CI = confidence interval.

Table 6
Mediation Analysis With Likelihood as the Outcome Variable for Study 2

Effect	Outcome	Predictor	β	*SE*	*p*	CI lower	CI upper
Direct effects	Likelihood	Frame	0.12	0.08	.120	−0.03	0.27
		Affective context	−0.04	0.04	.411	−0.12	0.05
		Positive feelings	0.94	0.03	<.001	0.88	1.00
		Negative feelings	0.15	0.08	.054	0.00	0.30
		Perceived risk	−0.14	0.08	.078	−0.29	0.02
	Perceived risk	Frame	0.02	0.06	.772	−0.10	0.10
		Affective context	0.00	0.03	.990	−0.07	0.07
		Positive feelings	0.11	0.02	<.001	0.07	0.15
		Negative feelings	0.90	0.02	<.001	0.85	0.94
	Positive feelings	Frame	−0.83	0.15	<.001	−1.12	−0.54
		Affective context	0.22	0.09	.015	0.04	0.40
	Negative feelings	Frame	0.39	0.14	.005	0.12	0.66
		Affective context	0.02	0.09	.816	−0.15	0.19
Indirect effects	Likelihood	Frame via perceived risk	0.00	0.01	.775	−0.02	0.01
		Frame via positive feelings	−0.78	0.14	<.001	−1.05	−0.50
		Frame via negative feelings	0.06	0.04	.113	−0.01	0.13
		Frame via positive feelings via risk	0.01	0.01	.111	0.00	0.03
		Frame via negative feelings via risk	−0.05	0.03	.136	−0.10	0.02
		Context via perceived risk	0.00	0.01	.999	−0.01	0.01
		Context via positive feelings	0.21	0.09	.016	0.04	0.37
		Context via negative feelings	0.00	0.01	.817	−0.22	0.03
		Context via positive feelings via risk	0.00	0.00	.170	−0.01	0.00
		Context via negative feelings via risk	0.00	0.01	.818	−0.02	0.02
Total effects		Frame	−0.64	0.15	<.001	−0.94	−0.34
		Affective context	0.18	0.12	.119	−0.05	0.41

Note. *SE* = standard error; CI = confidence interval.

medications. There was a significant total effect of frame given these designated pathways (IE: $\beta = 0.28$, $p = .045$), but no significant total effect of affective context emerged.

Likelihood to take the medication. This mediation model was specified by setting the likelihood to take the medication as the outcome variable and frame, affective context, positive feelings, negative feelings, and perceived risk as predictor variables. Positive feelings, negative feelings, and perceived risk were included as mediator variables of the effect of frame and affective context on likelihood to take the medication. As in Study 1, frame influenced the likelihood to take the medication via positive feelings about the medication (IE: $\beta = -0.78$, $p < .001$). The gain frame led to greater positive feelings about the medication, which in turn led to an increased likelihood to take the medication, whereas the loss frame led to a reduction in positive feelings about the medication and a reduced willingness to take the medication. Additionally, affective context influenced likelihood to take the medication via positive feelings about the medication (IE: $\beta = 0.206$, $p = .016$). Positive affective context led to more positive feelings about the medication, which in turn led to a greater likelihood to take the medication. There was a significant total effect of frame on likelihood to take the medication given the designated pathways ($\beta = -0.64$, $p < .001$), but no significant total effect of affective context emerged. See Figure 1 for an illustration of the model.

Discussion

Study 2 aimed to replicate Study 1 but also to manipulate incidental affective contexts to examine their effects on the risk perceptions of medications and the likelihood to take medications. The results of Study 2 replicate and extend the findings of Study 1. Specifically, frame influenced integral affect, which served a mediating role in frame's influence on the medications' perceived riskiness and the likelihood to take the medication. Study 2 extended these findings by showing that although incidental affective contexts do not directly influence the likelihood of taking medications, they do indirectly influence the likelihood to take medications by altering integral feelings about the medications. Overall, the results suggest that attribute framing integrally manipulates affect, whereas affective context acted as an incidental manipulation of affect, rather than a direct influence on perceptions of the medications. As such, the mechanism of both framing and incidental manipulations of affect change integral feelings and subsequently the evaluations of medications.

General Discussion

The goal of the present work was to examine how attribute framing and affective contexts influence affect and subsequently alter evaluations of medications. Study 1 highlighted the importance of considering integral affective reactions to a medication's side effects when determining the perceived riskiness and likelihood to take the medication. Positive integral affect in the gain frame led to an increased willingness to take the medications, whereas negative evaluations in the loss frame influenced the medications' perceived risk. These results are consistent with other work involving risky choice framing, which shows that integral affect is the important affective pathway that guides choice (Cheung & Mikels, 2011; Stark et al., 2017; Young et al., 2019). Importantly, though, this work extends previous research on risky choice framing to attribute framing as well as into the health domain.

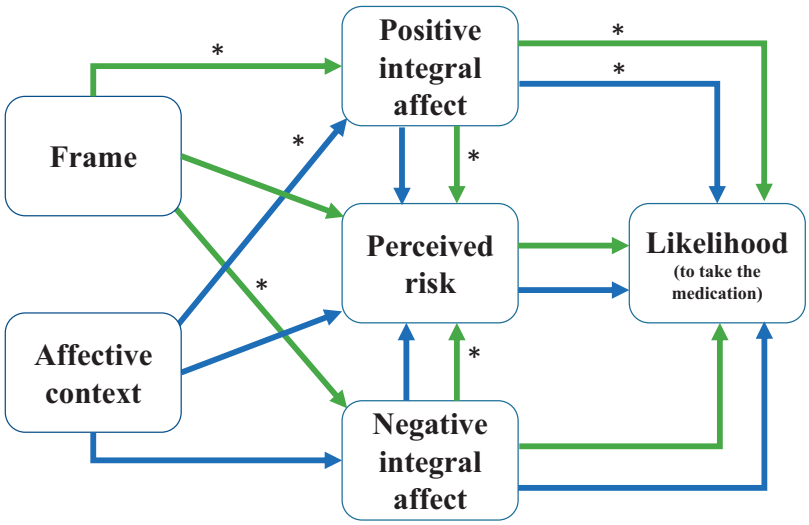

Figure 1. Mediation model examining the effect Mediation analyses examining the effect of frame and affective context on likelihood to take the medication via positive integral affect, perceived risk, and negative integral affect. The green arrows indicate the pathways from frame. The blue arrows indicate the pathways from affective context. Asterisks indicate significant paths. Frame indirectly influenced the likelihood to take the medication by manipulating positive integral affect (IE: $\beta = -.78$, $p < .001$, 95% CI [−1.05, −0.50]). Although affective context did not directly influence the likelihood to take the medication, it did indirectly influence likelihood to take the medication (IE: $\beta = 0.21$, $p = .016$, 95% CI [0.04, 0.37]). See the online article for the color version of this figure.

Study 2 extended Study 1 by exploring the influence of incidental affective contexts within an attribute framing paradigm. The results of Study 2 show that although incidental affect manipulations do not directly impact risk perceptions and the likelihood to take a medication, they do influence the integral affective evaluations of the medications and as such indirectly impact the likelihood to take medications. Importantly, though, it appears that the main driver of risk perceptions and the likelihood to take medication is integral affect. Greater negative integral affect leads to greater risk perceptions, whereas greater positive integral affect about a medication leads people to report a greater likelihood to take medicine. These findings underscore the importance of considering the mechanisms by which incidental affect impacts judgments and decision-making. The present study suggests that incidental affect may not have a direct relationship to judgments and instead has an indirect relationship that depends on integral affect.

Implications and Limitations

These findings have important implications for how medical professionals present information to people. Specifically, this work could be utilized by health care professionals to encourage health-related behaviors and adherence to medical treatments by leveraging positivity. Health care professionals could frame medical information in terms of gain-framed attributes rather than loss-framed attributes. Gain frames may be particularly useful when people are apprehensive about taking a particular medication or are not consistently adhering to the recommended treatment plan involving their medication. Moreover, these findings could be particularly beneficial when considering the decision-making of older adults (see Finucane, 2008; Mikels, Shuster, & Thai, 2015; Peters, Hess, Västfjäll, & Auman, 2007). Older adults, compared to younger adults, are especially attentive to, remember, and are impacted by positive information relative to negative information: the *positivity effect* (Carstensen & Mikels, 2005; Mikels, Reed, Hardy, & Loeckenoff, 2014; Reed, Chan, & Mikels, 2014). The positivity effect could be leveraged by health care professionals to enhance the degree to which older adults follow through with treatment plans. Given that older adults are faced with medical challenges to a greater frequency than younger adults, it is especially important to ensure their treatment is as effective as possible. Future work could explore the influence of integral and incidental affect on risk perception and likelihood to take medication with older adults.

The limitations of this work revolve around two issues. Given that the participants did not actually consume any medication, the results of the present study are limited to the reported intention to take the medication but do not necessarily extend to the behavior of taking a medication. Thus, future research should aim to extend the findings of the current study to applied work aiming to create interventions to increase people's willingness to take medications and adhere to treatment plans. Second, our participants were introduced to hypothetical medications, rather than medications with which they are familiar. Perhaps manipulations of integral affect, such as attribute framing, would not be as potent for medications to which people have been exposed. For example, framing the probability of experiencing a particular side effect as either a gain or loss might not be as effective for popular over-the-counter headache medications like Advil but could be more effective for new medications being introduced to the market.

Our findings are relevant to the broader literature on attitude formation insofar as attitudes play an important role in intentions and behavior (Ajzen, 1991). Attitudes are global beliefs that involve cognitive as well as affective components (Breckler, 1984; Malhotra, 2005; Mikels, Maglio, Reed, & Kaplowitz, 2011; Schaller & Malhotra, 2015). In our studies, we measured positive and negative feelings about the medication given the probability of experiencing or not experiencing a particular side effect. In other words, we measured integral affective responses. In the attitude formation literature, attitudes are measured in terms of evaluations of instrumental and affective aspects (e.g., useful-useless, enjoyable-unenjoyable, respectively; Rhodes, Courneya, & Jones, 2002). How integral feelings contribute to the attitude formation process remains unknown and represents a promising direction for future research.

Conclusions

In conclusion, the present work explored how attribute framing and affective contexts can be used to manipulate affect and alter subsequent evaluations of risk and contribute to one's intention to take medication. These findings are consistent with past research suggesting that affective pathways can underlie judgments and decision-making. Importantly, the present work indicates that incidental affect influences judgments and evaluations through integral affect, underscoring the central role of integral affect in judgment and decision-making. In addition, these studies indicate that positivity may be uniquely able to facilitate people's willingness to take medications. As such, there are important applications for this research within the health care field that may help determine the most effective way to communicate medical attributes to people by leveraging positivity. Perhaps positivity helps the medicine go down when it comes to encouraging intentions to take medication.

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