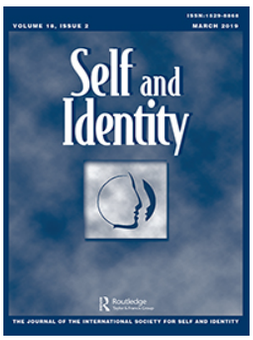

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Ironic effects of feedback on contingency of self-worth: Why self-reports of contingency are biased

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ABSTRACT

Contingent self-worth has been studied as an individual differences variable affecting how self-relevant information is processed. We examined the effects of self-relevant information on contingent self-worth as a dependent variable. In Experiment 1 ($N = 79$, college students), participants' performance contingency was higher after negative than positive performance feedback. In Experiment 2 ($N = 3764$, community sample), social approval and appearance contingencies were lower in a social approval condition than in control conditions. Mediation analyses suggested this effect was mediated by enhanced self-esteem. Thus, self-esteem increased due to the very source that participants came to regard as less important: Social approval. Results are explained in terms of sociometer theory and limited introspection abilities: All self-esteem is sensitive to external contingencies, people just become more aware of this when it is threatened.

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Our self-esteem depends on external contingencies to a large extent. Rejection, criticism, and failure can easily damage our egos; acceptance, praise, and success can boost them (e.g., cf. Crocker & Canevello, 2008; Crocker & Wolfe, 2001; Leary & Baumeister, 2000). William James (1890, p. 45) already noted that "Our self-feeling in this world depends entirely on what we back ourselves to be and do". More than a century later, the domains in which people stake their self-worth have been called contingencies of self-worth (Crocker & Wolfe, 2001). Different domains have been distinguished, from external contingencies such as others' approval, physical appearance, academic competence (Crocker, Luhtanen, Cooper, & Bouvrette, 2003) and financial success (Park, Ward, & Naragon-Gainey, 2017), to more intrinsic ones such as virtue (Crocker et al., 2003), self-congruence and personal growth (Vonk & Smit, 2012). External contingencies in particular are associated with lower self-esteem (e.g., Kernis, Lakey, & Heppner, 2008), lower psychological well-being (Crocker et al., 2003; Park & Crocker, 2008), depressive symptoms (Schöne, Tandler, & Stiensmeier-Pelster, 2015), and behavior

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problems such as academic problems, financial debts, or alcohol use (Crocker, 2002; Crocker & Luhtanen, 2003).

In the extant research, participants' self-reported contingencies are treated as fixed and preset. Some participants generally score high on contingency of self-worth, others low; for some, self-worth depend on their performance, for others on beauty. These pre-existing differences have been shown to affect responses to self-relevant information (e.g., Crocker & Luhtanen, 2003; Crocker et al., 2003; Park & Crocker, 2008). In the present studies, we focused on a fundamentally different question, in which contingency is a *dependent* variable: Are external contingencies affected by self-relevant feedback? Previous research suggests that they are: Social disapproval produced a higher degree of self-reported dependence on others' approval (Leary et al., 2003; Study 1). Also, women presented with sociocultural norms for ideal appearance reported basing their self-worth more strongly on appearance, becoming less satisfied with their bodies (Strahan et al., 2008).

Note that participants in these studies, in spite of the effects obtained, may have been entirely unaware of them: The psychological processes underlying swings in self-esteem may be unconscious, so people may not always be fully aware of the true contingencies that affect their self-esteem. Just as people cannot see a virus that reduces their physical well-being, the causes of increases or decreases in their psychological well-being may often be just as imperceptible. Thus, subjectively experienced, self-reported contingency need not converge with the actual effects of external feedback on fluctuations in self-esteem. In the studies by Leary et al. (2003), social (dis)approval affected participants' state self-esteem regardless of their prior ratings of whether their self-esteem depended on others or not. Even participants who indicated that their self-esteem was not affected by others showed increased self-esteem after social approval.

This suggests that self-reported contingency may sometimes reflect an erroneous conception of the true contingencies of self-esteem. More generally, people seem largely unaware of the processes underlying their thoughts and feelings (Wilson, 2002, 2003) and are incapable of direct introspection into these processes (Pronin, 2009). Accordingly, they may not be aware of the contingencies on which their self-worth is built. This would explain the rather modest correlation between contingency and actual fluctuations in self-esteem, i.e., self-esteem instability (*r*'s from .29 to .44; Jordan & Zeigler-Hill, 2013).

As noted by Ryan and Brown (2003, p. 74), self-esteem is only a concern when it is low: "If you need it, you don't have it, and if you have it, you don't need it." In the former case, the contingencies of self-esteem may be more tangible. This could explain why self-reported contingency is typically higher among participants with low self-esteem ($r = -.51$ in the study by Kernis et al., 2008). Having experienced that their self-esteem can suffer blows and is threatened by disapproval or failure, people with low self-esteem may simply be more aware of these contingencies. This would also explain our earlier finding that participants rated their self-worth as more contingent and volatile in a downward direction (e.g., experiencing lower self-esteem after failure) than in an upward direction (experiencing higher self-esteem after success); this difference emerged in our self-report measure of contingency that explicitly distinguishes a downward and an upward subscale (Vonk & Smit, 2012).

At the other end of the spectrum, people who are successful and are surrounded by supporting and caring others have no reason to question their self-worth, and hence may experience it as independent and unproblematic. As noted by Cooley (1902, p. 208), "We live in the minds of others without knowing it, just as we walk the solid ground without

thinking how it bears us up". Participants with high self-esteem may be walking the invisible ground provided by others' care, appreciation, and respect. This kind of subjectively experienced sovereignty may not be predictive of the actual effects of approval or rejection on their self-esteem. People may not be aware of the contingencies constituting the ground that carries their self-esteem, unless this ground becomes shaky. Negative feedback could make them painfully aware of their need for approval or success, thus increasing their subjectively experienced contingency. Conversely, people may develop a more non-contingent sense of self-worth when their self-esteem is regularly boosted by positive feedback.

We examined the effects of feedback in two domains, academic competence (Study 1) and social approval (Study 2) on self-reported contingency of self-worth. The first study, with college students as participants, focused on performance-related feedback. We tested the hypothesis that failure feedback regarding academic competence produces higher academic contingency, compared with success feedback. The second study, with a non-student sample, focused on the domain of social approval, testing the hypothesis that positive social feedback and acceptance would produce lower self-reported social contingency, compared with no-feedback control conditions.

Study 1

Participants and procedure

Participants were 79 undergraduates (19 male, 60 female). This sample size was based on a power estimate: A large effect size (Cohen's $d = .80$) was expected based on previous research on the effect of self-relevant feedback (Leary et al., 2003, study 1). For our study, this requires a sample size of 70 participants to compare two independent groups with a one-sided alpha of .05.

The experiment started with a computer task called the Academic Ability Task. This test allegedly consisted of three subscales: (1) general intelligence, (2) creativity, and (3) critical thinking. Participants were told that their test score was an indicator of academic success. In actuality, they were given bogus feedback.

The subscale "general intelligence" consisted of ten forced-choice questions with four response options (e.g., Which number logically follows in the series: 4 – 6 – 9 – 14 – 6 – …; (a) 6, (b) 17, (c) 19, and (d) 21). These questions were derived from an online IQ test (Van Thiel & Engelen, n.d.). The subscale "creativity" had five forced-choice questions with 4–6 response options (e.g., an abstract picture was shown with the question which figures participants recognized; (a) bird, rabbit and cat, (b) cowboy on a horse, (c) face of a smiling clown, and (d) all of all the above). These items were derived from an online creativity test (Koning, n.d.). The subscale "critical thinking" consisted of five forced-choice questions with two possible responses. These questions were derived from the Watson-Glaser Critical Thinking Test (Watson & Glaser, 1980). Participants had to respond to items such as: "(1) There are no jockeys who are heavyweight boxers, (2) All heavyweight boxers are big. This means: Jockeys are small", with response options (a) definitely true, (b) probably true. Participants had 25 s for each question. This time limit was used so that not all questions could be answered in time, causing uncertainty and thus making the bogus feedback credible.

After completing the test, the computer screen read: "Your scores on the Academic Ability Task are being calculated". Six seconds later, participants received, at random, either success (General intelligence: 66th percentile; Creativity: 89th percentile; Critical thinking: 62th percentile), or failure feedback (General intelligence: 31th percentile; Creativity: 54th percentile;

Critical Thinking: 27th percentile) about their test results. Scores below the 35th percentile were presented in red, scores between the 35th percentile and the 55th percentile in orange, scores between the 55th and 80th percentile in green, and scores above the 80th percentile were presented in dark green. To ensure participants comprehended and remembered the feedback, they were asked to indicate for each subscale if their score was sufficient (above the 55th percentile) or insufficient (below the 55th percentile). In the Dutch grading system, grades run from 1 to 10, and the boundary between "insufficient" and "barely sufficient" is between 5.5 and 5.6, so this borderline was familiar to our participants.

Next, the contingencies of self-worth scale (Crocker et al., 2003) was administered, followed by the assessment of demographic data (gender, age, major, and level), and the manipulation check. Finally, participants were paid and debriefed.

Measures

Manipulation check

At the end of the experiment, participants were asked in an open-ended question whether their result for each subscale of the academic ability task was sufficient or insufficient. Four participants indicated for at least one of the three subscales, that they received success feedback when in fact they received failure feedback or vice versa. The results did not change when these participants were excluded. Therefore, all participants were retained.

Contingencies of self-worth

We translated the subscales academic competence ($\alpha = .80$, 5 items), others' approval ($\alpha = .78$, 5 items), family support ($\alpha = .84$, 5 items), and virtue ($\alpha = .78$, 5 items) of the contingencies of self-worth questionnaire (Crocker et al., 2003). Participants indicated how much they agreed (1 = strongly disagree, 7 = strongly agree) with items such as "My self-esteem is influenced by my academic performance", "It is important to my self-respect that I have a family that cares about me", "My self-esteem depends on the opinions others hold of me", and "I couldn't respect myself if I didn't live up to a moral code".

Results and discussion

A multivariate analysis of variance on the four types of contingency with feedback (success vs. failure) as a between-subjects variable (multivariate $F(4, 74) = 2.01$, $p = .10$, Hedges' $g = .32$) yielded the predicted effect on the contingency academic competence; means, standard deviations, and univariate F tests are presented in Table 1. After failure feedback, participants reported that their feelings of self-worth depended more strongly on academic competence

Table 1. Means for four domains of contingency, standard deviations, 95% confidence intervals, and statistics for effect of condition in experiment 1.

	Failure		Success					
	M (SD)	95% CI	*M* (SD)	95% CI	*F*	MSE	*p*	*g*
Academic competence	5.12 (.88)	4.85–5.40	4.68 (.85)	4.41–4.95	5.16	3.88	.03	.50
Others' approval	4.73 (.87)	4.44–5.01	4.72 (.92)	4.44–5.00	.00	.00	.97	.01
Family support	5.05 (1.17)	4.74–5.36	5.21 (.72)	4.90–5.51	.53	.50	.47	−.16
Virtue	4.61 (1.06)	4.31–4.92	4.45 (.85)	4.15–4.75	.55	.51	.46	.16

than after success feedback. Feedback did not affect the other contingencies (social approval, family support, or virtue). As a measure of effect size, Hedges *g* was used (the difference between the two means, divided by the pooled within-groups standard deviation; Hedges, 1982). As can be seen in Table 1, the *g* value for the effect on academic competence was .5, indicating a "medium" effect size according to Cohen's (1988) benchmarks for standardized difference measures.

Thus, as we had anticipated, contingency of self-worth was affected by performance feedback.[1] Possibly, participants receiving feedback that threatened their academic self-worth became more aware of the importance of their academic outcomes to their self-worth; or, participants receiving positive feedback became more at ease about their academic abilities and, as a consequence, felt less vulnerable in this domain. We cannot tell if one or both of these effects were operating, because there was no control condition. We will get back to this in the Discussion.

No effects were found for the other contingency domains. These findings suggest that, even though contingencies in different domains tend to be correlated with each other (e.g., Vonk & Smit, 2012), there is value in distinguishing multiple domains, because effects in one domain do not necessarily generalize to another.

Study 2

In Study 2, we aim to extend our findings to another contingency domain by examining the effects of approval in the social realm. Considering the particularly maladaptive effects of high contingency in this domain (e.g., Crocker & Luhtanen, 2003; Crocker & Park, 2004), it is all the more important to understand if and how social contingency can be reduced. To test our hypothesis that positive feedback reduces contingency of self-worth, we analyzed data that had been collected earlier in a large-scale study on self-esteem and self-determination (Vonk, Celik, Jolij, & Stoeller, 2014). In addition to addressing a different contingency domain, this study also differed from Study 1 in containing a neutral, no-feedback control condition, instead of a negative feedback condition.

The study was conducted via Internet, with a relatively long time lapse between the intervention and the assessment of dependent variables. In laboratory studies, it is often unclear how the effects bear on people in their everyday lives. Once participants leave the lab, they may shake off the effects of personal feedback like a dog getting out of the water, and get on with business as usual. The present data-set allowed us to examine effects of social feedback that are more than skin deep. During a period of two weeks, participants in the experimental group received positive feedback via email twice a week.[2] Contingent self-esteem was assessed after this period. Because level of self-esteem was assessed as well, this data-set allowed us to examine the role of self-esteem as a potential mediator of the hypothesized effects on contingency.

Method

Procedure

Participants were recruited via announcements in newspapers, magazines, and websites. As an incentive, they would receive their personal scores on the tests after completing the study, and a lottery ticket for a monetary prize after each completed assessment. Treatment

of participants was in accordance with established ethical guidelines and institutional approval was obtained for the study.

After the introduction and informed consent form, participants answered a series of background questions. Subsequently, they were asked to provide their email address and a personal user name, which they would use throughout the study. They received an email message with a link and password to start the first set of questionnaires. Before the intervention started, participants filled out three sets of questionnaires during a period of three weeks, one each week. Each time a new set of questionnaires was available, they received an email invitation and, if necessary, a reminder five days later.

After completion of the third assessment, participants in the experimental condition were asked to start keeping a journal at least twice a week and send it in via email. Each time after they sent their journal, they were given personalized positive feedback on it (see Manipulation). After two weeks, when they had thus received four emails with positive feedback, all participants were again invited to complete a set of questionnaires, and dependent variables were assessed.

Design and manipulation

Upon entering the experiment, participants were randomly assigned to conditions by the computer program, with the restriction that the odds of being in the feedback group were lower than in the control groups: Because of limits to the number of journals that we were able to respond to, the chance of being assigned to one of the two control conditions was higher than to the experimental condition. After the third assessment, experimental participants were asked to start keeping a personal diary, and to write twice a week for at least 20 min. They were invited to send in their writings and told that they would be given brief personal responses, "to encourage you to keep up the writing". They could write about anything on their minds, and as much as they wanted to, whenever they felt like it, as long as they wrote at least twice a week for at least 20 min. They were asked to focus on their thoughts and feelings of the day, and not be concerned with explaining facts and background, or with sentence construction and grammar. If they were already keeping a diary, they could simply continue doing that and send (parts of) it. They could type or, if they preferred paper and pencil writing, send in a scan. It was stressed that we wanted to receive unedited, original pieces of writing. They were told that a team of psychologists would process the diaries, and that they would most likely receive a response from different persons each time; we wanted to avoid that participants felt they were developing a personal relationship with the responder, because this could yield beneficial effects beyond the effect of positive feedback. The name of the responder was unknown to them, just as they themselves were asked to remain anonymous and avoid all identifying information. Because the word "psychologist" could trigger associatons with a therapist, participants were also told that the psychologists were not counselors or therapists.

To avoid experimenter demand as much as possible, the intervention was entirely isolated from the questionnaires and assessments. It was clear to participants that the psychologists responding to their journals were not researchers and were not involved in the study. The journal sending and responding was done via a separate email address, so participants did not visit the study's website for this. They did not provide their study user name, and they knew the journals were not connected to their other data.

Some participants merely wrote brief chitchat about their everyday lives, others expressed their heart and souls. The journals were evenly distributed across a team of four different psychologists. They returned a personalized response of between 100 and 200 words within two days. All responses were sent from the same mail address labeled "diary". Responders had followed an extensive instruction and handled five trial journal fragments as training material. The key was positive regard and approval, expressed in phrases such as "You're right …", "You handled it very well …", and "What a wonderful idea …" They were not to give any advice or guidance. To keep it general and short, the feedback was not detailed. Sometimes it was about what the participant reported, sometimes about how s/he wrote about it. Responders adapted to the participant in language and writing style, depth of thinking/feeling, and topic. If responders reencountered a participant, they were not to refer to earlier journals.

There were two control conditions, one in which participants did nothing in particular during the two intervention weeks (No-Diary Control); another one in which they kept a journal just as the experimental group, but they did not send it in, so they were writing solely for themselves (Diary Control). If we had asked them to send the journal in without responding to it, or giving only a neutral response, this might have been interpreted as negative social feedback. The drawback is that we have to rely on their self-reports to establish if they faithfully followed the instruction.

Measures

After the two weeks during which the intervention took place, participants were invited to complete a new set of questionnaires. On this occasion, self-esteem and contingency of self-esteem were assessed. After two tests that are irrelevant to the present purposes, trait self-esteem was assessed by means of a Dutch translation (Jansen & Vonk, 2005) of the Rosenberg (1965) scale ($\alpha = .90$). Subsequently, contingency was assessed by the Paradise and Kernis (1999) global contingent self-esteem scale ($\alpha = .82$). Although the scale is aimed at general contingency, it contains domain-specific items similar to three of the external domains distinguished by Crocker et al. (2003): Competence/performance (e.g., "An important measure of my worth is how competently I perform"), social relations/acceptance by others (e.g., "My overall feelings about myself are heavily influenced by how much other people like and accept me") and physical appearance ("If I am told that I look good, I feel better about myself in general"). The distinction between these three components was corroborated by confirmatory factor analysis (Jansen & Vonk, 2005).

At the end of the questionnaire, participants in the two writing groups were asked to indicate how often and how long they had written in their diaries. In the Feedback group, they were also asked whether they had sent it to us, and if so, when they had received the most recent feedback.

Participants

Sample size was determined by the number of participants who signed in and, in the experimental condition, by the number of participants that we could reasonably provide with personal feedback within two days. In total, 4102 participants completed the background questionnaires and the first set of tests. A total of 3764 participants were still participating after the intervention, when dependent variables were assessed. They were 2722 females and 1030 males (for 12 participants, gender was not recorded due to a computer error). Their

ages ranged from 16 through 83, with a mean of 38.6 and 50% of participants between 30 and 46. Most participants had higher professional education (1651) or university at the Master's level (which, in The Netherlands, is the "default" level of college education) (1324).

Results

Diaries

84% of participants in the two writing groups indicated that they had written their diary, although almost half (45%) had written less than twice a week. These proportions were similar in the Experimental (Diary + feedback) and the Diary Control group. Overall, 74% had written for at least 20 min; in the experimental group, this was higher (88% vs 72%). In the experimental group, 96.5% of those who had written sent it in. In the analyses reported here, we excluded the 5 participants in the experimental group who indicated they did not send in their diary at all, because these participants were, effectively, not in the experimental condition. We retained all other participants, although the effects were stronger after excluding participants who wrote less than twice a week.

Contingency

Cronbach's alphas were .69 for physical appearance (three items), .78 for social approval (three items), and .68 for performance and internal standards (four items).[3] Preliminary analyses showed that the Diary Control and No-Diary Control groups did not differ from each other on any of the three contingency measures (M(diary) = 4.65, SD = 1.20, 95%-CI [4.60; 4.71], vs. M(control) = 4.68, SD = 1.24, 95%-CI [4.62; 4.74] for the main dependent variable, social contingency) or self-esteem (M = 5.33, SD = .98, 95%-CI [5.28; 5.38], vs. M = 5.33, SD = .97, 95%-CI [5.29; 5.37]; all univariate $F < 1$). Therefore, we pooled these groups together into one condition, called "Control" hereafter. We established that the unequal N's in the experimental vs. control group did not affect the statistical tests by producing differences in variance.

To test the effects of feedback on contingency, a multivariate analysis of variance was performed with condition (Experimental, Control) as the independent variable, and the three contingency measures (social, appearance, and performance) as dependent variables. Although the test for the multivariate effect failed to reach significance, $F(3, 3735) = 2.35$, $p = .071$, $\eta = .002$, univariate F tests showed that, as predicted, the feedback group reported lower social contingency than the control group. In addition, appearance contingency was reduced. There was no effect on performance contingency. Means, standard deviations, and F statistics are presented in Table 2. As can be seen, g values for the significant effects were .18, indicating "small" effects (Cohen, 1988).

Because the approval in the Experimental condition of this study was primarily social, we had expected reduced social contingency in this condition, not reduced appearance contingency: Participants were physically invisible to the journal responders, and responses did not contain any comments on physical appearance. Most likely, this effect was a by-product of the effect on social contingency, which was strongly related to appearance contingency ($r = .57$, $p < .001$; bootstrap 95%-CI [.55; .60]), as it typically is (In Crocker & Luhtanen, 2003, this correlation was .48 and the two were similarly associated with neuroticism, $r = .25$.) Indeed, the effect of feedback on appearance contingency disappeared when social contingency was added as covariate, $F(1, 3736) = 1.27$, MSE = .98, $p = .261$) – but, conversely, so

Table 2. Means, standard deviations, 95% confidence intervals, and statistics for effect of condition in experiment 2.

	Experimental		Pooled control					
	M (SD)	95% CI	*M* (SD)	95% CI	*F*(1,3739)	MSE	*p*	*g*
Contingency								
Social	4.45 (1.30)	4.25–4.65	4.67 (1.22)	4.63–4.71	4.36	1.49	.037	.18
Appearance	3.84 (1.21)	3.65–4.04	4.06 (1.21)	4.02–4.10	4.49	1.46	.034	.18
Performance	5.19 (.90)	5.04–5.34	5.21 (.93)	5.18–5.24	.04	.87	.847	.02
Self-esteem	5.56 (.78)	5.40–5.69	5.33 (.98)	5.30–5.36	7.47	.94	.006	.23

did the effect of feedback on social contingency disappear with appearance contingency as a covariate, $F(1, 3736) = 1.14$, MSE = 1.00, $p = .286$. Because of the high correlation between the two, it seems impossible to disentangle their effects. Presumably, the importance of being attractive is strongly tied to the need for social approval. In that sense, the two may be regarded as psychologically highly similar contingency domains, whereas performance contingency has a different psychological profile. This would explain that performance contingency was not affected at all in this study, involving social approval, whereas in Study 1, involving performance-related feedback, we obtained the converse pattern: Effects on performance contingency and not on the other domains.

Self-esteem and mediation. Not surprisingly, a main effect of condition showed that experimental participants had significantly higher self-esteem than control participants; see last row in Table 2.[4] Self-esteem was negatively correlated with self-contingency overall, $r = -.40$, 95%-CI [−.43; −.38], $p < .001$, and, more important for the mediation analyses below, with social contingency, $r = -.33$, 95%-CI [−.36; −.30], $p < .001$, and appearance contingency, $r = -.39$, 95%-CI [−.42; −.36], $p < .001$. We used the PROCESS procedure in SPSS (Hayes, 2013) to investigate two mediation models:

Model 1: Condition → social contingency → self-esteem;
Model 2: Condition → self-esteem → social contingency.

In both models, the indirect effect was tested with the Sobel test (Sobel, 1982), and because of the limitations of this test (e.g., Preacher & Hayes, 2004) also by computing 95% bias-corrected bootstrap confidence intervals based on 10,000 bootstrap samples (Hayes, 2013). The results of both mediation analyses are presented in Table 3.

Model 1 (DV = self-esteem). Decomposition of the significant total effect, $b = .226$, $p = .006$, into the direct and indirect effect showed that both the direct effect, $b = .170$, $p = .030$, and the indirect effect according to the Sobel test, $b = .056$, $z = 2.08$, $p = .038$, were significant. The significance of the indirect effect was confirmed by the fact that the 95%-bootstrap confidence interval [.003; .114] did not contain zero. The indirect effect was clearly weaker than the direct effect, with proportion mediated (i.e., indirect effect regression weight divided by total effect regression weight) equal to .248. Under the assumption of the causal sequence of model 1, the effect is mostly a direct effect.

Model 2 (DV = social contingency). In the second model, the total effect was significant, $b = -.217$, $p = .037$, but the direct effect was not, $b = -.125$, $p = .205$. According to the Sobel test, the indirect effect was significant, $b = -.092$, $z = -2.708$, $p = .007$. In agreement with this, the 95%-bootstrap confidence interval [−.148; −.039] did not contain zero. It should be noted that the nonsignificant direct effect actually was stronger than the significant indirect

Table 3. Mediation analyses: Regression analyses and effect decompositions.

Regression analyses								
DV	IV	*b*	SE(*b*)	*β*	*t*	*p*	R^2	*p*
SE	C	.226	.083	.045	2.73	.006	.002	.006
SE	C	.170	.078	.034	2.17	.034	.107	<.001
	SCS	−.258	.012	−.325	−20.99	<.001		
SE	C	.158	.076	.031	2.07	.038	.152	<.001
	SCA	−.312	.012	−.388	−25.73	<.001		
SCS	C	−.217	.104	−.034	−2.09	.037	.001	.037
SCS	C	−.125	.098	−.020	−1.27	.205	.107	<.001
	SE	−.409	.019	−.325	−20.99	<.001		
SCA	C	−.218	.103	−.035	−2.12	.034	.001	.034
SCA	C	−.109	.095	−.017	−1.15	.251	.152	<.001
	SE	−.483	.019	−.388	−25.73	<.001		
Effect decomposition			*Total effect*		*Direct effect*		*Indirect effect*	
		b	95%-CI		*b*	95%-CI	*b*	95%-CI *
Model 1 (C → SCS → SE)		.226	(.064; .388)		.170	(.017; .323)	.056	(.003; .114)
Model 2 (C → SE → SCS)		−.217	(−.421; −.013)		−.125	(−.318; .068)	−.092	(−.148; −.039)
Model 3 (C → SCA → SE)		.226	(.064; .388)		.158	(.009; .308)	.068	(.005; .134)
Model 4 (C → SE → SCA)		−.218	(−.420; −.016)		−.100	(−.295; .077)	−.109	(−.172; −.043)

Notes: C = condition, SCS = social contingency, SCA = appearance contingency, SE = self-esteem.
*Biased-corrected bootstrap CI for the indirect effect; standard parametric CI for total and direct effect.

effect (proportion mediated .425). Assuming the causal sequence of model 2, only an indirect effect of feedback (via self-esteem) on social contingency could be demonstrated, which is compatible with the idea that the reduction of social contingency is a consequence of heightened self-esteem caused by the feedback.

Our primary focus was on social contingency, but because of the unexpected effect on appearance contingency and our inability to disentangle the effects of social and appearance contingency, we will briefly describe the results for two additional mediation models in which social contingency was substituted by appearance contingency:

Model 3: Condition → appearance contingency → self-esteem;
Model 4: Condition → self-esteem → appearance contingency.

The results for models 3 and 4 closely parallel those of models 1 and 2 (see Table 3). In model 3 (DV = self-esteem), as in model 1, the direct effect was considerably stronger than the indirect effect, and both effects were statistically significant (for the indirect effect, Sobel's $z = 2.11$, p = .035). The results for model 4 (DV = appearance contingency) are highly similar to those of model 2, with the indirect effect being significant, $z = -2.72$, $p = .007$, while the direct effect was not.

Although these findings are tentative because the study was not designed to demonstrate causal pathways among these variables, the results of these analyses are compatible with the idea that the feedback intervention enhanced self-esteem and that this, in turn, produced a reduction in subjectively experienced social contingency.

Discussion

The present studies offer a novel perspective on contingencies of self-worth, by examining them as a dependent variable that can be affected by self-relevant feedback. In Study 1, we found that negative performance feedback had the effect of enhancing self-reported performance contingency, in comparison with positive feedback. Presumably, failure makes people more aware of how important that domain is to their feelings of self-worth. If so, this implies that the contingency was there all along, but participants did not realize it until their confidence in this domain was diminished.

It is also possible that the positive performance feedback made participants more confident about their abilities, and that this, in turn, reduced their subjectively experienced sensitivity to feedback in this domain. Both effects may have been at work to produce the difference between conditions in Study 1; we have no way of telling, because there was not a neutral control condition. In this type of paradigm, it seems impossible to include a psychologically neutral condition: Moderate or average test results are typically seen as "not good", and giving no feedback at all in this setting can create uncertainty which, by our argument, would enhance contingency. As a possible solution, we did conduct another study, similar to Study 1, in which we included a pretest of contingency, but it produced no significant effects at all. This study employed a different ability task (a remote associates task with an easy and a difficult condition, cf. Heatherton & Vohs, 2000), but we are inclined to ascribe the null findings to the pretest measurement: Participants may have been motivated to be consistent across the pre- and post-test. Also, the pretest may have made them more aware of the psychological process under investigation, thereby disrupting it.

In Study 2, we did have a control condition. For ethical reasons, it was not possible to include a negative condition here, but we were able to demonstrate that contingency of self-worth can be reduced as a consequence of positive feedback. We obtained this effect using an entirely different sample, task, feedback method, and contingency domain. As predicted, social approval reduced subjectively experienced contingency of self-worth in the social realm. This effect occurred only for the relevant domain of social acceptance and the related domain of appearance. These are both domains that are highly externally contingent and require approval and validation from others more than other contingencies; as a result, these are the more vulnerable domains of contingency and they are often particularly salient to people with lower self-esteem (cf. Crocker et al., 2003; Park & Crocker, 2008). From an applied point of view, then, these effects are interesting because they suggest that positive reinforcement by a psychologist, as in our Study, can reduce this vulnerability (cf. Rogers, 1961, on unconditional positive regard).

Theoretically, the effects of social feedback are ironic, because the very increase in self-esteem after positive feedback demonstrates that self-esteem *was* in fact contingent on others: The increase was caused by the interpersonal affirmation. So, if anything, these participants should have rated their self-worth as *more* dependent on others' approval. But they did not, which in our view reflects the subjective nature of self-reported contingency and people's limited access to the true psychological processes that affect their self-esteem. Whereas failure and rejection may enhance people's awareness that their self-esteem is vulnerable, approval and success may enhance their subjective sense of independence. Before further discussing this, we should note an alternative explanation to the findings from Study 2. Because participants in the experimental condition sent us their diaries and participants in

the private condition did not, it is conceivable that the former wrote more positively because of social desirability concerns. If so, these more favorable diary entries could have had a self-persuasion effect, making them feel better about themselves. We cannot rule out that this mechanism was involved, but we do have tentative evidence that the feedback had a least a partial role in the lower social contingency in the feedback condition: There was a significant correlation ($r = .21$, $p = .019$) between participants' social contingency and how many days it had been since they last received our feedback to their diary. Thus, even within the limited range of 0 to 4 days, contingency was lower as their last feedback was more recent. In combination with the results from Study 1, where no such a self-persuasion effect could have been involved, this suggests that feedback affected self-reported contingency at least in part.

The illusion of low contingency

As noted earlier, our view also explains several other results. It explains (a) why contingency ratings are higher on downward items (failure or rejection) than upward items (success or approval) (Vonk & Smit, 2012); (b) why the correlation between contingency and actual self-esteem instability is typically low (Kernis, 2003); and (c) why contingency is negatively correlated with self-esteem (in our Study 2, $r = -.40$). All of these findings, along with our results, indicate that contingencies of self-worth become more salient when self-esteem is threatened. Whereas people with high self-esteem may be walking "the solid ground without thinking how it bears us up" (Cooley, 1902, p. 208), those with low self-esteem have experienced that their road can be bumpy and muddy. By giving participants unconditional positive feedback to their personal diaries, we may have solidified their ground, making them *feel* more independent from others' approval.

Paradoxically, this implies that the very phenomenon under investigation – the effects of others' feedback on self-esteem – was subsequently underestimated by the participants under consideration: After experiencing an upward swing in their "sociometer" (Leary & Baumeister, 2000), they felt less dependent. This can be seen as part of a more general phenomenon, that people have erroneous conceptions of the unconscious processes guiding their thoughts, feelings, and behaviors (Wilson, 2002). People may not be aware of the contingencies on which their self-worth is actually built, unless the ground underneath becomes shaky, as it did in the failure condition of Study 1. Conversely, affirmation by others may yield a sense of personal strength and autonomy, as in Study 2. In that sense, participants' self-reported contingency may, at least partially, reflect a lack of insight into their own internal processes. A similar image arises from findings by Leary and his colleagues, who demonstrated that social rejection or disapproval produced sharp declines in participants' state self-esteem; these effects occurred regardless of their initial self-esteem level (Leary, Haupt, Strausser, & Chokel, 1998) and regardless of whether they themselves initially indicated that their self-esteem depended on others (Leary et al., 2003). Considering all of these findings jointly, the emerging picture is that we are all highly fragile when it comes to our self-worth; and that some of us – in particular, those with self-esteem concerns – are more aware of this than others.

Role of self-esteem

This idea dovetails with our results suggesting that the effects of the intervention on contingency were mediated by self-esteem. It should be noted that our mediation analyses do

not provide conclusive evidence for this, for at least three reasons. First, although for both social and appearance contingency the indirect effect (from feedback via self-esteem) was significant and the direct effect was not, our sample direct effect actually was much stronger than (social) or equal to (appearance) the indirect effect. Most likely, this counterintuitive result is a consequence of the greater power of the test for the indirect effect in comparison to the direct and total effect (e.g., Kenny & Judd, 2014); this can, at least in some circumstances, create a greater probability of making Type I errors (Loeys, Moerkerke, & Vansteelandt, 2015). Second, in studies like ours where the relationship between the mediator (self-esteem) and the dependent variable (contingency) is not under experimental control, estimates and tests for the indirect effect are vulnerable to bias due to possible common causes for mediator and outcome (Loeys et al., 2015). For example, personality differences that influence both contingency and self-esteem might inadvertently be part of our indirect effect estimate. Third, although our results are compatible with our idea of an indirect effect of feedback via self-esteem on self-contingency, the design of the present study was strictly correlational with regard to the relationship between self-esteem and contingency. Hence, it does not allow for testing the two causal models against each other. Mediation models can only be estimated under the *assumption* of a causal ordering, so finding a predicted pattern in such a model can never prove a causal sequence (Thoemmes, 2015; Wiedermann & von Eye, 2015). In spite of these limitations, our mediation analyses do test our hypothesis that feedback affects self-contingency via self-esteem: Refutation of this hypothesis was a real possibility, but the results did not indicate so.

In the studies by Leary et al. (2003), the dependent variable was a state self-esteem measure, which is more sensitive to feedback than global self-evaluations. Our Study 2 aimed to capture effects more enduring than the transient effects typically studied in lab experiments, so we looked at trait self-esteem. As described earlier, this study also contained a measure of state self-esteem on several assessments, and the results obtained for this measure paralleled those reported here. In the present analysis, we focused on the trait measure because contingency is a trait measure as well: Participants are typically asked to rate how the items generally apply to them, without any focus on this particular point in time. Our findings emerged in spite of this trait-like nature of the measurements, thus testifying to the strength of the effects.

Contingency and self-esteem instability

In all extant research on contingencies of self-worth, self-reported contingencies are treated as a reflection of real psychological contingencies. Do our findings imply that this assumption is invalid? On the one hand, we think people generally do realize in which domain their self-esteem is vulnerable, if only because they worry about that most. Indeed, Crocker and Luhtanen (2003) showed that divergent contingencies (i.e., academic competence vs. appearance) produce divergent effects during students' first year in college, indicating that at least their effects are real. On the other hand, the results by Leary et al. (2003) suggest that participants with low self-reported contingency underestimate their vulnerability: These participants indicated that their self-esteem did not depend on social (dis)approval, yet demonstrated soon afterwards that it in fact did. This implies that particularly self-reported *low* contingency may be biased; it could merely reflect that people feel safe and sound in their self-worth as long as their social environment is supportive, and tangible threats to self-esteem are absent.[5] Our paradoxical results in Study 2 point into the same direction:

Whereas participants in the feedback condition had in fact just demonstrated that their self-esteem was enhanced by social approval, their self-reported social contingency indicated that they felt *less* sensitive to it.

Nevertheless, it is conceivable that changes in subjective contingencies reflect actual changes. Participants in our Study 2 feedback group may have truly become less contingent: The bolstering of their self-esteem could have created a buffer against future social disapproval. This possibility could be examined by means of a follow-up approval–disapproval intervention, orthogonal to the preceding feedback condition: This would render data on participants' true responsiveness, circumventing the biases inherent to self-report measures (i.e., social desirability and limited self-knowledge). The best possible alternative measure is self-esteem instability (i.e., the standard deviation of state self-esteem across multiple assessments among the same participants; Kernis, Paradise, Whitaker, Wheatman, & Goldman, 2000), as an index of how volatile a person's self-esteem is. As noted, the correlation between contingency and instability is moderate, but instability does reflect actual shifts in self-esteem that are, most likely, caused by changes in a vulnerable contingency domain.

Fortunately, the data from Study 2 allowed us to examine if instability of self-esteem was affected by the intervention: Being a large study involving several assessments not described here (see Footnotes 2 and 4), it included three assessments of state self-esteem both before and after the intervention. We computed participants' standard deviations across the three assessments before and after, thus deriving two measures of self-esteem instability: Before and after the intervention. If contingency becomes objectively lower after the positive feedback, we would expect lower instability in the feedback condition after the intervention, that is, a Time (before, after) by Condition interaction. Analysis of variance on the two instability measures with Feedback as a between-subjects variable yielded a main effect of Time (instability in all conditions was higher before, $M = .49$, than after the intervention, $M = .44$, possibly as a result of the repeated measurements), but no effects of Feedback whatsoever (main effect and interaction both $F = .00$).

Thus, using the measures available at this point, we have no indication that the effects we found on self-reported contingency reflect real changes. On the other hand, it is certainly conceivable that positive or negative feedback can affect "true" contingency and self-esteem stability if it is a structural, enduring part of a person's life. Indeed, individual differences in contingencies of self-worth are most likely caused in part by individuals' personal history of self-esteem boosts and threats during childhood and later in life, for instance, with an intimate partner. Continuous positive appraisals by others may be internalized, just as the unconditional support from caretakers is internalized during childhood (e.g., Bowlby, 1980), thus providing a stable internal basis for self-esteem.

From social approval to true self-esteem

If positive feedback consolidates the ground one is walking on, it can reinforce itself by allowing people to be more at ease, to take bigger steps and even jumps that promote self-growth. Thereby, the positive effects instigated by others could eventually sustain themselves. Participants' interactions with others may become more open and relaxed because they are less concerned with receiving affirmation and approval, so others in turn may respond to them more favorably (cf. Murray, Griffin, Rose, & Bellavia, 2003; demonstrating that low self-esteem can put a strain on relationships). Just as self-affirmation (Steele, 1988), affirmation by others may make people more open-minded and less defensive in response

to threat. In addition, the confidence and security derived from social approval may encourage people to develop new initiatives and make more autonomous, self-congruent choices (Sheldon, 2014). Thus, a positive, supportive environment may in fact be the beginning of a process towards more independence.

Ironically, this suggests that "true" (Deci & Ryan, 1995) or "optimal" self-esteem (Kernis, 2003) can be enhanced quite effectively by merely fuelling the sociometer adequately (cf. Vonk, 2006). In this context, note that participants in Study 2 were only given 100–200 words of feedback twice a week; most likely, these were a minor portion of their many real-life social encounters during the week that impinged on their self-worth. This can explain why the effects in this study were modest in terms of effect size. During the study, participants were living their lives as usual and engaging in all kinds of interactions and activities that probably had far more impact. The intervention was only a very small portion of these everyday life events, so it had to compete against the major "error variance" caused by the ups and downs of daily living.

In the end, the origin of self-esteem may always be the approval and acceptance received by others. Negative feedback, failure, and rejection can make people tense and insecure. In sociometer terms, it is like driving with very little gasoline, when one's attention is continuously drawn to the meter and to any potential opportunity to fill up. This can create a spiral of more dependence on others' approval. Success, approval, and unconditional positive regard fill the belongingness tank, and allow one to relax and enjoy the scenery. It can make people more at ease with themselves and, consequently, more autonomous and free.

Notes

1. We replicated this finding in a second experiment with 83 participants, in which we also showed that the difference between the two feedback conditions was reduced after a self-compassion manipulation (Radstaak, 2009).
2. In fact the study lasted much longer (four months) and feedback was given for six weeks, but contingency of self-esteem was assessed after two weeks. In this paper, we describe only the parts of the study that are relevant to the present purposes. A description of the entire study and of all variables assessed can be obtained from the first author.
3. We looked at performance contingency and internal standards separately as well; these two scales produced the same pattern of results. Note that the "internal standard" items in the Kernis & Paradise scale do reflect performance to quite some extent, i.e.,: "A big determinant of how much I like myself is how well I perform up to the standards that I have set for myself" and "When I perform up to my expectations, I feel especially good about myself in general".
4. As noted (Footnote 2), this study involved more than the variables described here, and the feedback intervention went on for four weeks after contingencies of self-worth were assessed. At this point, among other variables, participants' state self-esteem was measured. The intervention had similar effects on state self-esteem: The effect of Condition was significant, $F(1, 3532) = 6.93$, MSE = .89, $p = .008$, $g = .23$, M(feedback) = 5.64, SD = .79, 95%-CI = [5.48; 5.80] vs. M(control) = 5.42, SD = .95, 95%-CI = [5.39; 5.46].
5. Note that such underestimation in the absence of a real threat may be a more general phenomenon. For instance, results by Park, Young, and Eastwick (2015) indicate that men may be attracted to more intelligent women at a distance, but almost literally take a step back when a woman who outsmarts them becomes closer to them, producing a threat to their self-evaluations.

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No potential conflict of interest was reported by the authors.

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