

Running head: WEIGHT GAIN AND PERSONALITY CHANGE

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I know not to, but I can't help it:
Weight gain and changes in impulsivity-related personality traits

Angelina R. Sutin
Florida State University College of Medicine
National Institute on Aging

Paul T. Costa, Jr. and Wayne Chan
National Institute on Aging

Yuri Milaneschi
VU University Medical Center
National Institute on Aging

William W. Eaton
Johns Hopkins Bloomberg School of Public Health

Alan B. Zonderman and Luigi Ferrucci
National Institute on Aging

Antonio Terracciano
Florida State University College of Medicine
National Institute on Aging

Address correspondence to:
Angelina R. Sutin, Ph.D.
Florida State University College of Medicine
1115 W. Call Street
Tallahassee, FL 32306
angelina.sutin@med.fsu.edu

Abstract

Reciprocal relations between weight and psychological factors suggest deep connections between mind and body. Personality traits are linked to weight gain; weight gain may likewise be associated with personality change. Using data from two diverse longitudinal samples (total $N=1,919$; 10 years average follow-up), we show that significant weight gain is associated with increases in both impulsiveness and deliberation: In both samples, middle-aged adults who gained $\geq 10\%$ of their baseline body weight by follow-up increased in their tendency to give in to temptation, yet were more thoughtful about the consequences of their actions. The present research moves beyond life events to implicate health status in adult personality development. The findings also suggest that interventions that focus on the emotional component of impulse control may be more effective because even those who become more thoughtful about the consequences of their actions may have limited success at inhibiting their behavior.

Body weight and indices of adiposity, such as Body Mass Index (BMI), are associated with physical health, but weight also has significant and pervasive psychological consequences. Awareness of body size and body dissatisfaction emerge early in childhood (Tremblay, Lovsin, Zecevic, & Larivière, 2011), and the psychological effects of being an overweight child can persist into adulthood (Sánchez-Villegas et al., 2010). As adults, overweight or obese individuals are at greater risk for poor body image (Schwartz & Brownell, 2004), depressive symptoms (Luppino et al., 2010), and discrimination (Puhl & Heuer, 2009). Likewise, psychological factors, such as clinical depression (Luppino et al., 2010), depressive symptoms (Sutin & Zonderman, in press), and personality (Sutin, Ferrucci, Zonderman, & Terracciano, 2011), increase risk for weight gain. Thus, in the case of body weight, mind and body are intimately intertwined.

Personality traits, which reflect our characteristic ways of thinking, feeling, and behaving, contribute to abnormal weight (Brummett et al., 2006; Chapman, Fiscella, Duberstein, Coletta, & Kawachi, 2009; Terracciano et al., 2009) and weight gain (Magee & Heaven, 2011; Sutin et al., 2011). For example, high Neuroticism and low Conscientiousness are associated with higher BMI and aspects of impulsivity, including impulsiveness and lack of self-discipline, have been associated with weight gain across adulthood (Sutin et al., 2011). The direction of this relation is unlikely to be unidirectional. Body weight is, in part, a physical manifestation of an individual's lifestyle and may be a source of information about the individual's personality that could lead to personality change over time. Although previous research found that baseline weight was mostly unrelated to personality development across adulthood (Sutin et al., 2011), changes in weight, particularly weight gain, may prompt personality change. That is, weight itself may not foster changes in personality but the process of gaining a significant amount of

weight could lead individuals to view themselves differently and to think, feel, and behave differently over time. Weight gain can be a very physical reminder of the inability to control one's impulses, and those who gain weight may come to perceive themselves to be, or to actually become, more impulsive and less disciplined. Further, the stigma associated with weight gain could feed back on to how individuals perceive or describe themselves.

The present study tested whether gain of at least 10% of baseline body weight by follow-up was associated with change in impulsivity-related personality traits, which are among the traits with the strongest theoretical and empirical links with body weight (Davis, 2010). We hypothesized that those who gained weight would become more impulsive, undisciplined, and less thoughtful because high impulsiveness, low self-discipline and low deliberation have been associated with higher BMI and weight gain (Sutin et al., 2011). We tested this hypothesis in two longitudinal samples that varied in age and socio-economic status.

Method

Samples

BLSA. Participants from the Baltimore Longitudinal Study of Aging (BLSA; $N=1,457$) with at least two assessments of personality and weight were selected from the BLSA cohort. This sample was 48% female, 70% White, 23% Black, and 7% other ethnicities. Participants were middle to older age ($M=58.74$ years at baseline, $SD=15.35$) and educated ($M=17.09$ years of education, $SD=2.52$).

ECA. Participants were drawn from the Baltimore Epidemiologic Catchment Area (ECA) study, a multiwave cohort study of East Baltimore residents (Eaton et al., 1997; Eaton, Kalaydjian, Scharfstein, Mezuk, & Ding, 2007). Personality in the ECA was available from Wave 3 (referred to as baseline) and Wave 4 (referred to as follow-up; Löckenhoff et al., 2008).

A total of 462 participants had valid personality and weight measures at both waves. This sample was 64% female, 61% White, 36% Black, and 3% other ethnicities. Participants were younger ($M=45.39$ years old at baseline, $SD=10.69$) and less educated ($M=12.58$ years of education, $SD=2.41$) than BLSA participants.

Measures

Personality traits. In both samples, personality was assessed with the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992). Participants completed it twice, approximately 10 years apart in the BLSA ($M=10.58$, $SD=5.15$, range 1-21 years) and approximately 8 years apart in the ECA ($M=8.38$, $SD=2.10$; range 4-12 years). We focused primarily on the impulsivity-related facets of the NEO-PI-R: N5: Impulsiveness, E5: Excitement-Seeking, C5: Self-Discipline, and C6: Deliberation. Raw scores were converted to T-scores ($M=50$, $SD=10$) using American combined-sex norms (Costa & McCrae, 1992).

Weight. Weight and height were either measured by a trained staff clinician (BLSA, ECA follow-up) or self-reported (ECA baseline). Weight gain was calculated as a 10% increase in weight between baseline and follow-up; 16% of BLSA participants and 38% of ECA participants gained at least 10% of their baseline body weight by follow-up.

Analysis

To test whether significant weight gain was associated with change in the impulsivity-related traits, we regressed personality at follow-up on baseline personality, age, age squared, sex, ethnicity, education, interval between testing, and weight gain ($0 < 10\%$ gain, $1 \geq 10\%$ gain). Additional analyses controlled for baseline BMI and tested age, sex, ethnicity, education, and baseline BMI as moderators of the weight gain-personality change associations. For comparison,

we also tested whether significant weight loss ($\geq 10\%$ loss of baseline body weight) was associated with personality change.

Results

Consistent with our hypothesis, weight gain in both samples was associated with change in N5: Impulsiveness: Compared to those who did not gain a significant amount of weight, those who gained greater than 10% of their body weight between baseline and follow-up increased in their tendency to give in to temptations ($\beta_s = .06$ and $.11$, $p < .01$ for BLSA and ECA, respectively). Those who did not gain weight showed the typical normative decline (~ 1 T-score over a decade) in impulsivity, whereas those who gained weight increased in impulsiveness (~ 1 T-score point) between baseline and follow-up (Figure 1). Surprisingly and counter to our hypothesis, weight gain was also associated with increases in C6: Deliberation in both samples: Those who gained weight increased in their tendency to think before acting ($\beta_s = .05$ and $.09$, $p < .05$ for BLSA and ECA, respectively; Figure 2). Participants who gained weight had more than double the increase in C6: Deliberation than participants with stable weight (an increase of ~ 2 T-score points versus ~ 1 T-score point). Weight gain was not associated with changes in either E5: Excitement-Seeking ($\beta_s = .02$ and $-.01$, ns , for BLSA and ECA, respectively) or C5: Self-Discipline (both $\beta_s = .00$, ns , for BLSA and ECA). Results were similar when weight gain was entered as a continuous, rather than dichotomous, variable and when increases in BMI were used instead of increases in weight. Controlling for baseline BMI did not alter the results, nor were there any interactions between baseline BMI and weight gain on changes in personality. The supplementary table shows the associations between weight gain and change in the five broad dimensions of personality. There was a small effect of weight gain on increases in Conscientiousness in the BLSA, which was due to the association between weight

gain and increases in C6: Deliberation. Weight gain was unrelated to change in any of the other personality traits.

We next tested whether demographic factors moderated any of these associations. In the BLSA, the increase in C6: Deliberation among those who gained weight was mainly due to younger participants ($\beta_{\text{interaction}} = -.06, p < .05$). Age did not moderate this association in the ECA ($\beta_{\text{interaction}} = .02, ns$), which is consistent with the BLSA in that ECA participants were younger and this effect was only apparent among the young to middle aged in the BLSA. Sex, ethnicity, and education did not moderate this association in either sample and none of the demographic factors moderated the association between weight gain and change in the other three traits.

In contrast to weight gain, weight loss was not consistently associated with personality change. Those who lost at least 10% of their baseline weight (~7% of participants in each sample) decreased in N5: Impulsiveness in the ECA ($\beta = -.14, p < .05$), but weight loss was unrelated to changes in this trait in the BLSA ($\beta = -.01, ns$). Weight loss was associated with a decrease in C6: Deliberation in the BLSA ($\beta = -.04, p < .05$) but was unrelated to changes in this trait in the ECA ($\beta = .04, ns$). Weight loss was unrelated to either E5: Excitement-Seeking ($\beta = -.01$ and $.04, ns$, respectively for BLSA and ECA) or C5: Self-Discipline ($\beta = .00$ and $.06, ns$, respectively for BLSA and ECA).

Discussion

Across two samples that varied in age and socio-economic status, significant weight gain was associated with increases in both impulsiveness and deliberation. That is, those who gained at least 10% of their baseline body weight described themselves as more likely to give in to temptations, but also as more thoughtful. Although seemingly modest, these changes are nonetheless substantively meaningful. For example, at follow-up, there was a difference of ~2 T-

score points in impulsiveness between those who gained weight and those who did not. This translates into roughly 1/5 of a SD increase in impulsiveness over one decade, which is larger than the expected decrease in this trait that occurs with normal aging (Terracciano et al., 2005). The effect sizes are also of similar magnitude to the correlation between life events and personality change, such as starting a new job and increases in Conscientiousness (Lüdtke, Roberts, Trautwein, & Nagy, 2011), and to the effect of personality on consequential life outcomes, including weight gain (Sutin et al., 2011) and longevity (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

Impulsivity-related traits have been associated with weight and weight gain in previous studies (Sutin et al., 2011), but weight gain did not have an equal association with change in these traits over time in the present study. Several mechanisms, both psychological and physiological, may lead from weight gain to personality change. There is a pervasive stereotype in American society that overweight and obese individuals are lazy, weak-willed, undisciplined, and struggle with willpower (Puhl & Heuer, 2010). As individuals gain weight, they may internalize these stereotypes and come to view their personalities as consistent with such impressions of the obese. Although they viewed themselves as more impulsive, participants who gained weight in our two samples did not come to resemble other aspects of the stereotype. Weight gain, for example, was unrelated to changes in self-discipline and was related to an increase, not decrease, in deliberation.

A second possibility is that physiological mechanisms associated with weight gain could contribute to the relation between weight gain and changes in personality. For example, overweight and obese individuals tend to have higher levels of inflammation (Visser, Bouter, McQuillan, Wener, & Harris, 1999), and chronic inflammation may reduce the ability to

effectively regulate emotions and control behavior (Miller, Capuron, & Raison, 2005). The increase in both impulsiveness and deliberation, replicated across two diverse samples, suggests that weight gain could be associated with detrimental psychophysiological effects on the emotional component of impulsivity (i.e., giving in to urges, inability to resist cravings), and that failure to control behavior could also raise awareness of the consequences associated with those behaviors. Likewise, preliminary evidence indicates that there are psychological changes that accompany bariatric surgery (Järholm et al., 2012), which further suggests that physiological changes in the body are associated with psychological changes.

Significant weight gain can hardly go unnoticed by friends and family, and feedback from close others may heighten attention to eating behavior. For example, overweight and obese individuals most often cite friends and parents as the source of weight stigmatization (Puhl, Moss-Racusin, Schwartz, & Brownell, 2008) and such stigmatization may bring greater awareness to how much the individual is eating. A close other may be more likely to make an offhand comment about a second helping at dinner to someone in the midst of weight gain than to someone whose weight is stable. This heightened attention may be associated with an increased tendency to think before acting, even if those thoughts do not translate into planned and effective behaviors. Increases in deliberation may reflect the rationalization that often accompanies unhealthy eating behaviors (Kemp, Bui, & Grier, 2011).

The present research has implications for adult personality development. Research on personality change in adulthood typically focuses on its normative trajectory (Terracciano, McCrae, Brant, & Costa, 2005) and how life events potentially alter this path (Specht, Egloff, & Schmukle, 2011). The present research indicates that physical changes in the body are also associated with the trajectory of personality over time. Notably, our findings both push against

and amplify normative changes in impulsivity-related traits. The normative trajectory of N5: Impulsiveness is a clear linear decline with age, but significant weight gain pushes against this developmental trend. As people gain weight, they may become more impulsive, perhaps because weight gain is very physical evidence of the failure to control cravings. In contrast to impulsiveness, C6: Deliberation tends to increase for everyone across adulthood, but weight gain may amplify this normative age-related trend.

The present research suggests a potential downward spiral for those struggling with their weight. The impulsiveness aspect of Neuroticism is the strongest personality trait contributor to weight gain (Sutin et al., 2011), and our current findings suggest that weight gain is associated with increases in this trait. The inability to control cravings may reinforce a vicious cycle that weakens the self-control muscle (Baumeister, Vohs, & Tice, 2007): Yielding to temptation today may reduce the ability (self-control/will-power) to resist cravings tomorrow. Thus, individuals who gain weight may be at greater risk for additional weight gain through changes in their personality.

This research had several strengths, including two large independent longitudinal samples that varied in age and socio-economic status, a well-established measure of personality traits, and two assessments of weight and personality over a significant period of time. We could not, however, distinguish between actual personality change and changes in self-perception of personality. Future research would benefit from additional personality measures, such as observer reports, which could help to disentangle these types of change. Future research could also explore the mechanisms that contribute to these effects and how consideration of an individual's personality may improve intervention effectiveness. For example, weight-loss interventions that focus primarily on providing information about healthy lifestyle choices may

be less effective than those aimed at the emotional aspects of impulsivity. In addition, with correlational data in the present study, we could not disentangle the direction of the relation between weight gain and changes in personality or if a third variable is responsible for the observed associations. Future research would thus benefit from more than two assessments of personality and weight to test hypotheses about the temporal relations between the two. Overall, our findings suggest that even when individuals think about the consequences of their actions, their emotional impulses might be too hard to overcome.

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Figure Captions

Figure 1. Estimated marginal means of N5: Impulsiveness at baseline and follow-up by weight gain in the combined sample ($N = 1,919$). The estimated marginal means control for age at baseline, sex, ethnicity, education, and interval between assessments.

Figure 2. Estimated marginal means of C6: Deliberation at baseline and follow-up by weight gain in the combined sample ($N = 1,919$). The estimated marginal means control for age at baseline, sex, ethnicity, education, and interval between assessments.

Figure 1

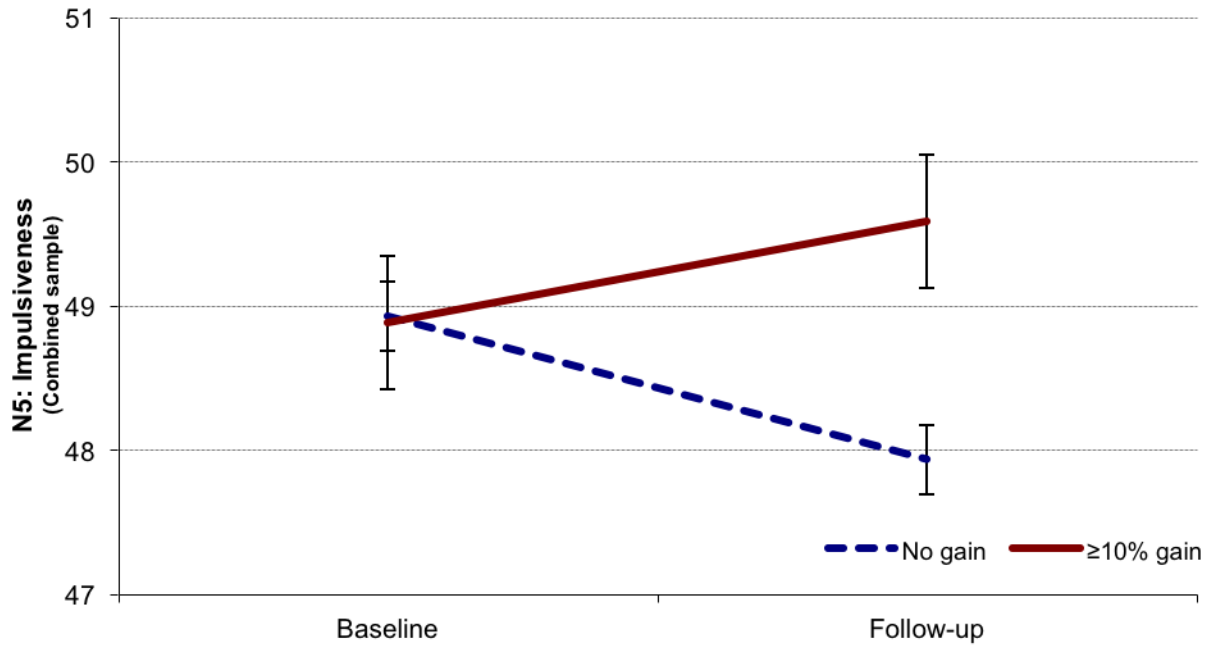


Figure 2

