

Gender, Race, and Obesity-Related Quality of Life at Extreme Levels of Obesity

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Abstract

WHITE, MARNEY A., PATRICK M. O'NEIL, RONETTE L. KOLOTKIN, AND T. KARL BYRNE. Gender, race, and obesity-related quality of life at extreme levels of obesity. *Obes Res.* 2004;12:949–955.

Objective: Research investigating obesity-related quality of life (QOL) has shown that at increasing levels of overweight, individuals report more impaired QOL. Further, some research has indicated that white women suffer more impairment than men and African Americans. The current study sought to expand the existing literature by investigating an extreme subsample of the obese population. It was expected that participants in the current study would report more impaired obesity-related QOL than in previous research conducted with less obese individuals. It was also hypothesized that race and gender groups would differ in obesity-related QOL and that the relationship between degree of overweight and QOL would not be consistent across race and gender groups.

Research Methods and Procedures: Impact of Weight on Quality of Life Questionnaire-Lite Version data were collected from 512 individuals seeking gastric bypass surgery (mean BMI = 53.3)

Results: Results confirmed the study hypotheses. In general, white women reported the most QOL impairment, despite having significantly lower BMI than other race/gender groups. Compared with previous studies, the ob-

served relationships between BMI and QOL were somewhat attenuated.

Discussion: Various domains of QOL may be differentially affected by degree of obesity; these relationships are not homogeneous throughout the obese population.

Key words: quality of life, bariatric surgery, race, gender, IWQOL

Introduction

Obesity has been associated with impaired quality of life (QOL)¹ in a variety of domains, including physical functioning, public distress, sexual functioning, self-esteem, and work-related QOL (1–3). A number of factors may influence the relationships among obesity, psychosocial functioning, and QOL (4,5). These factors include race, gender, and degree of overweight.

Obesity-related QOL has been found to differ between African Americans and whites in varying ways, although the direction of the difference has varied across studies (6,7). Other findings suggest that obesity is associated with less body image impairment and less social stigmatization among African Americans, especially among women (8–10).

Regarding gender, research has indicated that the relationship of obesity to depression is more pronounced among women than men; in fact, one population-based study found that overweight men were less likely to experience major depression than were healthy-weight men (11). Within overweight and obese samples, women are sometimes, although not always, found to have lower QOL (1,3,6). At lower levels of BMI, more pronounced gender differences have been reported for weight-related QOL, whereas at relatively higher levels of BMI, gender differences have been reported for health-related QOL (3,6).

Investigations of the relationship between QOL and level of BMI have reported that QOL impairment worsens with

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¹ Nonstandard abbreviations: QOL, quality of life; BDI, Beck Depression Inventory; IWQOL, Impact of Weight on Quality of Life Questionnaire; IWQOL-Lite, Impact of Weight on Quality of Life Questionnaire-Lite Version; BED, binge eating disorder.

increasing obesity (1,2,7). This relationship has been reported with measures of general health-related QOL (e.g., 1) and measures of obesity-specific QOL (e.g., 2, 7). It should be noted that most studies examining correlations between BMI and obesity-related QOL have utilized samples composed predominantly of people in mild to moderate ranges of overweight (2,3,7,12).

Persons seeking weight loss surgery represent a uniquely extreme subsample of the obese population, with much higher BMIs and more comorbid health problems. These individuals' willingness to undergo voluntary surgery likely speaks to the level of impairment they have suffered as a function of obesity. Gastric bypass surgery candidates have demonstrated significantly more impaired obesity-related QOL than other obese subgroups, even those of comparable level of obesity (7,13,14).

Using a sample of several hundred patients seeking gastric bypass surgery, the present study examined obesity-related QOL at high levels of BMI, with attention paid to the possible moderating effects of race, gender, and (within this extremely obese group) BMI. We also assessed the effect of race and gender on the strength of the relationships between BMI and various QOL domains. The hypotheses were: 1) this extremely obese sample would demonstrate levels of QOL more severely impaired than those reported for less obese samples, 2) race and gender subgroups of this extremely obese sample would differ on levels of obesity-related QOL in the various domains, and 3) the strength of the correlations between BMI and obesity-related QOL would differ across race and gender subgroups.

Research Methods and Procedures

Participants

Participants were 512 individuals evaluated for gastric bypass surgery at the Medical University of South Carolina from 1998 to 2002. The present sample consisted of all patients who presented for gastric bypass evaluation, with the exception of a very small number who did not complete the questionnaires. The sample consisted of 333 (65.0%) white women, 86 (16.8%) African-American women, 78 (15.2%) white men, and 15 (2.9%) African-American men.

Assessment Measures and Procedure

As part of the psychological screening for surgery, participants completed a general assessment of psychopathology and eating behaviors and demographic characteristics, the Beck Depression Inventory (BDI), and either the Impact of Weight on Quality of Life Questionnaire (IWQOL) (15) or the Impact of Weight on Quality of Life Questionnaire-Lite Version (IWQOL-Lite) (3). The IWQOL and IWQOL-Lite are QOL instruments designed specifically for use with obese individuals. Participants rate items according to the extent to which they perceive their weight as adversely

affecting various activities, cognitions, and feelings, using a five-point scale from "never true" to "always true." The IWQOL has been reduced from 74 items to a 31-item version, the IWQOL-Lite, which consists of a subset of the original items. Because most, but not all, participants in the present study completed the full version of the scale, scores were calculated using the factor analytically derived IWQOL-Lite subscales. The IWQOL-Lite yields a total score as well as subscale scores reflecting impairment in physical function, self-esteem, sexual life, public distress, and work. Subscale scores are transformed to represent the percentage of the total possible sum for that subscale, such that scores range from 0 to 100, with higher scores indicating better QOL. Subscale scores are calculated only if the participant has completed at least 50% of the items for the subscale; a total score is calculated only if the participant has completed at least 75% of the items for the entire questionnaire. Thus, although a total of 512 participants completed at least some portion of the IWQOL-Lite, in some cases there was an insufficient number of completed items to calculate total score or all subscale scores. Thus, the sample size for the total score was 505, and the sample sizes for subscales ranged from 482 to 509.

Statistical Analyses and Comparison Studies

Statistical analyses were conducted using the SPSS/PC statistical program (version 10.0.7 for Windows; SPSS, Inc., Chicago, IL). To detect differences in IWQOL-Lite means between the current sample and previously reported studies, Student's *t* tests for independent samples were conducted. The means for the current sample were compared with findings from other obese samples in which the IWQOL-Lite was used: the gastric bypass subgroup described by Kolotkin et al. (7), binge eating disorder (BED) and non-BED gastric bypass patients (14), the gastric bypass patients studied by Kolotkin et al. (13), and a group of nontreatment-seeking controls who were BMI matched to gastric bypass surgery candidates (13).

To detect IWQOL-Lite differences in race/gender groups after controlling for BMI, linear multiple regression analyses were conducted. Race and gender groups (i.e., black women, black men, white women, and white men) were dummy-coded. Entering three of the dummy vectors per regression model permitted analysis of group differences. The race/gender group with the highest mean QOL score was selected as the initial base cell (comparison group). In this manner, the other race/gender groups were contrasted to the group with the highest score; dummy variables with significant regression coefficients significantly differed from the comparison group. To allow contrasts of each of the race/gender groups, the same regression analyses were conducted (using the other race/gender groups as the base cell) until all combinations had been compared. To test

Table 1. Mean BMI and IWQOL-Lite subscale scores across studies

	A		B	C	D	E	F
	Present study		Kolotkin et al. (7)	De Zwaan et al. (14) non-BED	De Zwaan et al. (14) BED	Kolotkin et al. (13) Control	Kolotkin et al. (13) GB
	Valid	<i>n</i>	(<i>n</i> = 141)	(<i>n</i> = 91)	(<i>n</i> = 19)	(<i>n</i> = 87)	(<i>n</i> = 339)
BMI (SD)	512	53.3 (11.3)	49.0 (9.5)*	48.5 (8.5)*	48.0 (7.9)*	43.5 (6.8)*	47.7 (8.1)*
Physical function (SD)	508	21.2 (19.1)	44.8 (29.4)†	36.2 (20.2)†	26.8 (13.6)	47.1 (19.7)†	26.4 (17.9)†
Self-esteem (SD)	509	34.4 (27.3)	46.2 (27.8)†	44.5 (22.9)†	29.6 (16.1)	40.8 (27.2)	22.3 (20.6)‡
Sexual life (SD)	484	41.5 (31.3)	44.7 (29.8)	55.3 (29.6)†	38.7 (20.6)	60.8 (29.0)†	40.2 (31.0)
Public distress (SD)	509	33.9 (23.9)	41.4 (25.7)	49.4 (22.9)†	42.2 (22.7)	61.6 (24.2)†	35.9 (24.1)
Work (SD)	482	50.3 (27.7)	40.4 (28.4)‡	67.6 (25.6)†	49.3 (14.3)	65.4 (22.9)†	44.4 (25.9)
Total (SD)	505	32.3 (18.8)	44.0 (22.2)†	46.7 (17.6)†	34.0 (9.9)	52.0 (19.7)†	31.1 (17.0)

To control for multiple comparisons, an α level of $p < 0.001$ was used for significance tests on IWQOL-Lite scores.

* BMI significantly lower than present study sample.

† IWQOL-Lite score significantly higher (less impaired) than present study sample.

‡ IWQOL-Lite score significantly lower (more impaired) than present study sample. Note that scores are calculated only if participants completed at least 50% of items for a subscale or 75% of items for total score.

differences in correlation coefficients across race/gender groups and across studies, Fisher's z transformations were conducted.

Results

Descriptive information for the full sample appears in Table 1. Table 1 also includes IWQOL-Lite findings from the previously published samples described above (columns B to F). Compared to the previous studies investigating obesity-related QOL among exclusively obese samples, the participants in the current study were significantly more obese (BMI range = 30.9 to 105.8). Independent Student's t tests indicated that, in general, participants in the present study suffered more impaired QOL than did the participants in three of the five samples from other studies.

Figure 1 displays the subscale and total IWQOL-Lite scores for the race/gender groups. White women had a significantly lower BMI than the other groups [$F(3,508) = 21.10$, $p < .001$]. The groups did not differ in age (mean = 42.5) or level of depressive symptoms as measured by the BDI (mean = 19.16). Regression analyses showed that the race/gender groups significantly differed on self-esteem [$R^2 = 0.05$; $F(3,505) = 8.48$; $p < 0.001$] and sexual life [$R^2 = 0.04$; $F(3,480) = 6.96$; $p < 0.001$]. Because the other QOL variables were significantly related to BMI, regression analyses for those variables compared groups while controlling for BMI. The race/gender groups differed on the physical function subscale [R^2 change = 0.028; $F(3,503) = 5.02$;

$p = 0.002$] and the total IWQOL-Lite scores [R^2 change = 0.050; $F(3,500) = 9.26$; $p < 0.001$]. The groups did not differ on work or public distress.

Group contrasts indicated that in general, African-American men reported less impairment than the other groups, despite highest BMI levels, and white women reported the most impaired QOL, despite the lowest BMI levels. African-American women generally reported more impairment than did African-American men. On the physical function and total scores, white men reported more impairment than did African-American men.

Level of impairment varied markedly across QOL domains in the total sample and in each race/gender group, despite the substantial degree of overall impairment. With each scale having a range of possible scores from 0 to 100, mean scores for the total sample ranged from 21.2 (physical function) to 50.3 (work). To further explore the pattern of impairment across QOL domains and race/gender groups, each participant's lowest subscale score (i.e., area of greatest impairment) was determined. Some participants had equivalent scores on more than one subscale; in such cases, both scores were counted as their "lowest" score. χ^2 tests revealed that the race/gender groups significantly differed in the proportions of individuals whose lowest scores were the physical function, sexual life, or self-esteem domains. Black men (67%) and white men (63%) were much more likely to report the greatest area of impairment in the physical function domain, whereas black women (51%) and white

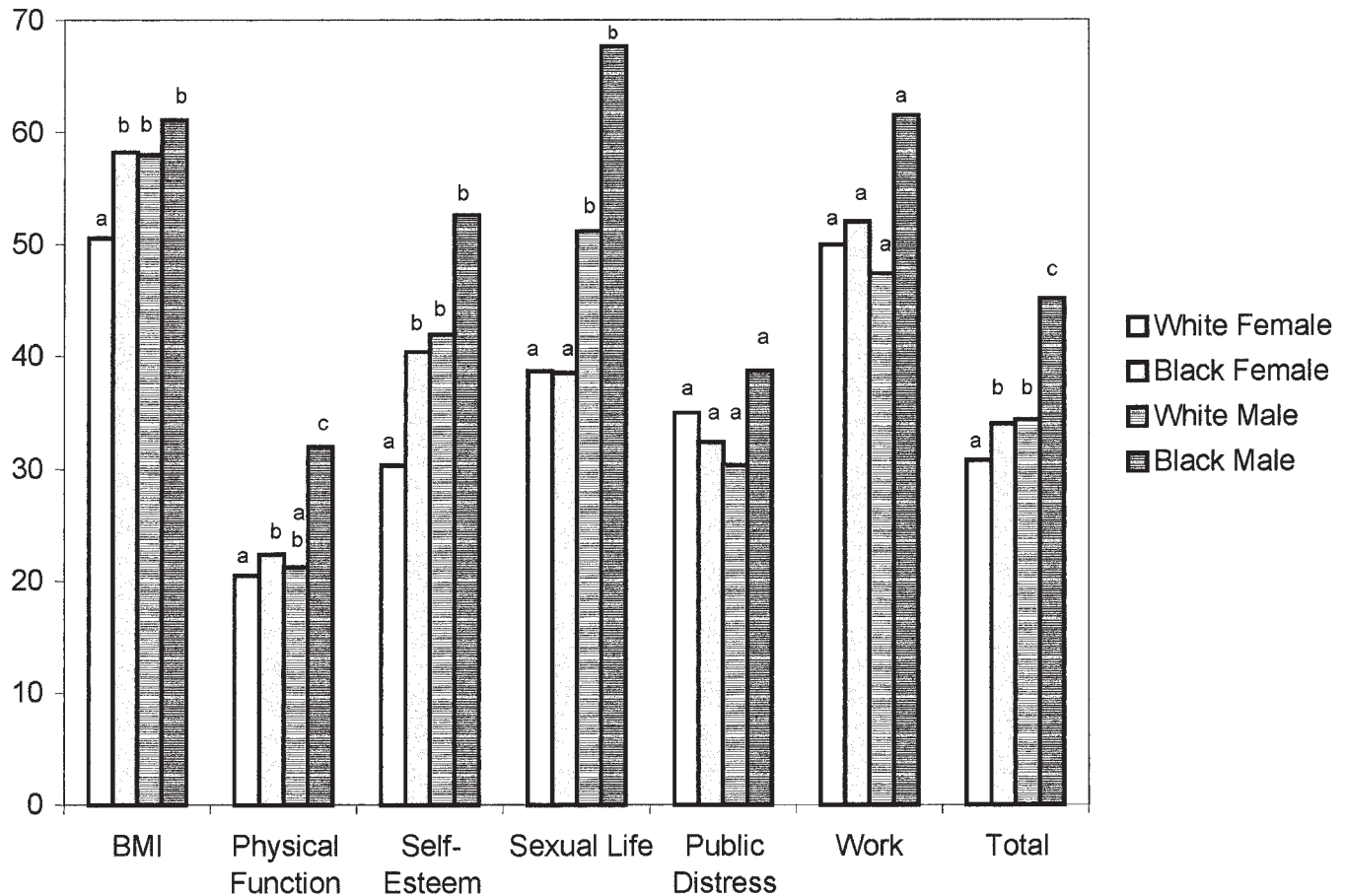


Figure 1: BMI and IWQOL-Lite subscale scores for race and gender groups. Group means with a common letter do not differ from one another; group means without a common letter differ significantly ($p < 0.05$). Contrasts for IWQOL-Lite scores conducted after controlling for BMI (where appropriate).

women (46%) were less likely. Sexual life was the domain with greatest reported impairment for 35% of black women and 24% of white women, compared with only 11% of white men and no black men. Among white women, 25% reported the most impairment in self-esteem, whereas only 13% of black women and black men and 14% of white men reported the greatest impairment in this domain.

The hypothesis that the relationship between IWQOL-Lite subscales and BMI would differ across race and gender groups was tested using Fisher's r -to- z transformations. Correlations between QOL indices and BMI for the four gender/race subgroups are reported in Table 2. Correlations were significantly different among the race/gender groups on the self-esteem and work subscales ($p < 0.05$; $z > \pm 1.96$). In general, the correlations between BMI and QOL subscales tended to be weaker for women, especially white women. There was no correlation between BMI and BDI score for the total sample or for any subgroup except white men. The present correlations were then compared with those reported by Kolotkin et al. (3) with their sample of

individuals with BMI ranging from the healthy range to severely obese. As shown in Table 3, the relationship between BMI and QOL was significantly less strong in the current study for total score and all scale scores.

Discussion

One aim of the current study was to investigate obesity-related QOL within an extremely obese sample. Recent research has shown incremental worsening of health- and obesity-related QOL with increasing levels of obesity. The current sample was significantly more obese than previously reported samples (mean BMI = 53.3). Obesity-related QOL was generally more impaired within our sample than within three of the five comparison samples (Table 1, columns B, C, and E) that had mean BMIs ranging from 43.5 to 49.0, including two samples of gastric bypass patients (7,13,14). However, this was not true of the other two samples shown (Table 1, columns D and F) (13,14), although subjects in those two samples were significantly less

Table 2. Correlations between QOL and BMI for race/gender groups

Variable pair (BMI with QOL)	White female (n = 314–332)	Black female (n = 80–86)	White male (n = 74–78)	Black male (n = 14–15)	Total sample (N = 482–509)
Physical function	−0.17 ^{†a}	−0.31 ^{†a}	−0.42 ^{†a}	−0.26 ^a	−0.21 [†]
<i>Self-esteem</i>	−0.04 ^a	−0.12 ^a	−0.22 ^{†a}	−0.69 ^{†b}	−0.04
Sexual life	−0.05 ^a	−0.09 ^a	−0.02 ^a	−0.30 ^a	−0.02
Public distress	−0.38 ^{†a}	−0.37 ^{†a}	−0.48 ^{†a}	−0.60 ^{*a}	−0.39 [†]
<i>Work</i>	−0.09 ^a	−0.27 ^{†ab}	−0.32 ^{†ab}	−0.67 ^{†b}	−0.18 [†]
Total	−0.21 ^{†a}	−0.29 ^{†a}	−0.42 ^{†a}	−0.55 ^{*a}	−0.22 [†]
BDI	0.00 ^a	0.10 ^a	0.23 ^{*a}	0.40 ^a	0.06

Among race/gender groups, for each subscale, correlation coefficients with common superscript do not differ from one another, and group correlation coefficients without a common superscript differ significantly ($p < 0.05$, using a modified Bonferroni procedure (18) to control for multiple contrasts). QOL variables on which group correlations differed significantly are labeled in italics. As discussed in *Research Methods and Procedures*, sample sizes differed slightly across correlation coefficients.

* Correlation coefficient $p < 0.05$.

† Correlation coefficient $p < 0.01$.

obese than those in this study (mean BMIs ~ 48). One possible explanation is that the relationship between obesity and QOL impairment is moderated by comorbid conditions. Of the two samples that reported generally comparable levels of impairment to our sample, the majority (i.e., 77%) of gastric bypass patients in one (Table 1, column F; 13) had at least one comorbid condition, with QOL worsening with more conditions, and the subjects in the other sample (Column D; 14) had BED. Taken together, these comparisons suggest that increasing BMI per se exerts a deleterious

effect on obesity-related QOL in the absence of a comorbid condition and that certain comorbid conditions further impair QOL.

The present study found numerous race and gender differences in obesity-related QOL. White women reported significantly more impaired QOL in most domains, as well as total QOL. Further, African-American men in this study reported the least impairment in weight-related QOL, despite being more obese than the other demographic groups. The pattern of differences parallels recent research showing more obesity-related impairment for white women than for African-American women and white and African-American men (7). Previous research investigating race and gender has been conducted with obese individuals at much lower levels of obesity than those in the current study. Therefore, the current findings support and extend the existing research on race, gender, and obesity-related QOL, as well as the literature showing racial/ethnic differences in weight-related attitudes and dieting behaviors (8,10,16). It appears that even at extreme levels of obesity, the deleterious effects on QOL are not experienced equally across demographic subgroups. It should be noted, however, that despite statistical significance, the magnitude of some of the differences was rather small. Given the quite impaired level of most of the groups' scores, the clinical significance of small differences between severely impaired scores is uncertain. Further, because the IWQOL-Lite is a measure of weight-related QOL, the present results may not necessarily reflect overall QOL.

This study also investigated the relationship between BMI and QOL at an extreme level of obesity. Within the entire sample, BMI was significantly related to total score

Table 3. Correlations between QOL and BMI for current study and Kolotkin et al. (3)

Variable pair (BMI with QOL)	Current study (n = 482–509)	Kolotkin et al. (3) (n = 1907)	Z-score
Physical function	−0.21*	−0.61*	9.89
Self-esteem	−0.04	−0.34*	6.18
Sexual life	−0.02	−0.30*	5.75
Public distress	−0.39*	−0.68*	8.29
Work	−0.18*	−0.35*	3.66
Total	−0.22*	−0.59*	9.05

All z scores indicate significant between-study differences in correlation coefficients, $p < 0.05$.

Kolotkin et al. (3) reported mean BMI = 37.2 (women) and 36.6 (men).

* Correlation coefficient $p < 0.01$.

and to three of the five subscale scores on the IWQOL-Lite. However, the relationships between BMI and QOL indices were significantly less strong than those previously reported within other samples of less obese participants. It should be noted that although participants in the current study represented an extreme population in terms of BMI, there was sufficient range in BMI (30.9 to 105.8) to permit significant correlation. Further, the distribution of scores on the IWQOL-Lite subscales also indicated a wide range and sufficient variability. Therefore, it does not seem that the finding of attenuated correlations is merely an artifact of restricted range.

It is noteworthy that the relationship between BMI and obesity-related QOL differed across demographic groups. In general, the relationships between BMI and IWQOL-Lite subscales were weakest among white women. In most cases in which differences in correlations were observed, the groups with higher correlations had higher (less impaired) IWQOL-Lite scores. However, there was ample range of QOL in all groups with lower scores to permit emergence of significant correlations. Therefore, it appears that the lower correlations were not an artifact of restricted range but rather reflected a true attenuated relationship between QOL and BMI within that group. To our knowledge, this is the first study to investigate differences in the relationships between BMI and obesity-related QOL across demographic groups.

The finding of weakened correlations between BMI and IWQOL-Lite measures in the total sample suggests that beyond a certain level of obesity, QOL was so impaired that there was little relative detriment from increasing BMI. One explanation may be that at severe levels of obesity, the high rate of health-related comorbidities may impact QOL, such that the relationship between BMI and QOL is somewhat diminished. Indeed, Heo et al. (5) have reported that pain and obesity-related comorbidities (such as hypertension, diabetes, coronary heart disease, and myocardial infarction) mediate the effect of BMI on health-related QOL.

The differences among race/gender groups in BMI-QOL correlations indicate that these demographic characteristics are important moderators of obesity's effect on QOL. If there is a level of BMI beyond which greater obesity has less influence on QOL, this level appears to vary across demographic groups. Further, different correlational patterns observed across groups may reflect gender and ethnic differences in emphasis on body weight (8,9).

A limitation of this study was the disproportionate sample size. The underrepresentation of African-American men in the study did not allow for standard group comparisons. However, regression analysis was used to account for vastly different group sizes. Although the demographic breakdown differed from the population at large, it accurately represented the race/gender breakdown of the patients seeking bariatric surgery in our institution. In addition, the demo-

graphic distribution in the current study approximated that in other studies of QOL among obese treatment seekers, with the largest proportion of participants being white women (1,7,17). Indeed, the group QOL differences found here may partially explain the different group representations among treatment seekers, in that greater distress may lead to enhanced likelihood of seeking treatment, especially aggressive treatment.

In conclusion, the current findings provide yet more evidence of the strikingly negative impact of extreme obesity on QOL. At the same time, they show the substantial degree of heterogeneity of QOL impairment even within a severely obese surgery-seeking sample. Level of impairment varied among race/gender groups, as did the degree of relationship of BMI to QOL. Greater impairment was more consistently observed in some domains than in others. Future studies should investigate the influence of specific QOL domains on treatment seeking and efforts to lose weight. In addition, future research should explore potential mediators (e.g., comorbidities, gender, race) of the relationship between BMI and obesity-related QOL.

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