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Socialization and selection effects in the association between weight conscious peer groups and thin-ideal internalization: A co-twin control study

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ABSTRACT

Affiliation with weight conscious peer groups is theorized to increase thin-ideal internalization through socialization processes. However, selection effects could contribute if genetic and/or environmental predispositions lead to affiliation with weight conscious peers. Co-twin control methodology was used to examine socialization and selection effects in 614 female twins (ages 8–15) from the Michigan State University Twin Registry (MSUTR). Thin-ideal internalization and peer group characteristics were assessed via self-report questionnaires. Results suggested the presence of both socialization and selection effects. In terms of socialization, twins who reported increased exposure to weight conscious peers relative to their co-twins had elevated thin-ideal internalization scores, regardless of zygosity. However, associations between weight conscious peers and thin-ideal internationalization within twin pairs were attenuated, suggesting that genetic and shared environmental selection effects also contribute. Findings significantly extend previous work by confirming the presence of socialization processes and highlighting selection processes to be examined in future longitudinal research.

Introduction

Thin-ideal internalization (i.e., the extent to which an individual accepts and attempts to attain socially defined ideals of beauty; Thompson & Stice, 2001) has been identified as a risk factor for the development of disordered eating and eating disorders (see reviews, Stice, 2002; Thompson & Stice, 2001). Interventions aimed at reducing thin-ideal internalization demonstrate promise in preventing the development of disordered eating (Stice, Becker, & Yokum, 2013). Knowledge of the etiology of thin-ideal internalization could lead to enhanced effectiveness of these prevention efforts, as new information on specific risk factors for thin-ideal internalization could be used to modify and strengthen existing prevention programs.

One potentially important factor is affiliation with weight conscious peer groups (i.e., peer groups that are highly focused on topics such as attractiveness, body weight, body shape, exercise, and dieting). These types of peer groups are included in theoretical models of the development of thin-ideal internalization and subsequent disordered eating (e.g., tripartite model; Keery, van den Berg, & Thompson, 2004). Studies suggest significant cross-sectional correlations between weight conscious peer groups and thin-ideal internalization in adolescent girls, with moderate-to-large effect sizes (Clark & Tiggemann, 2006; Jones, Vigfusdottir, & Lee, 2004; Keery et al., 2004; Shroff & Thompson, 2006).

However, the lack of longitudinal or experimental studies to date limits the causal inferences that can be drawn. Specifically, rather than affiliation with weight conscious peer groups directly causing increases in thin-ideal internalization via socialization effects, it is possible that girls who are already more inclined toward thin-ideal internalization are more likely to select into weight conscious peer groups. Such selection effects would occur if

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pre-existing genetic and/or environmental factors lead an individual to select weight conscious peers (i.e., exposure to weight conscious peer groups is non-random). The possibility of genetic selection is consistent with the theory of gene-environment correlations, in which an individual's exposure to risk environments is influenced by (i.e., correlated with) their genotype (Scarr & McCartney, 1983). Thus, individuals with elevated genetic risk for thin-ideal internalization may also be more likely to select environments that perpetuate this risk. Environmental selection, on the other hand, would be present when environmental circumstances, such as family beliefs and behaviors regarding body image and weight (Rodgers & Chabrol, 2009), lead to selection of weight conscious peers. In either case, observed elevations in thin-ideal internalization in girls affiliated with weight conscious peer groups could be entirely or partially due to pre-existing genetic or shared environmental factors, rather than purely due to exposure to weight conscious peers (i.e., socialization processes).

One way to examine socialization and selection effects is through longitudinal research that examines whether pre-existing genetic and/or environmental factors drive an individual to select weight conscious peer groups (i.e., selection) and, while accounting for the effects of selection, also examine whether thin-ideal internalization increases as a result of exposure to weight conscious peers (i.e., socialization). Although some longitudinal research on weight conscious peer groups and *disordered eating* with these types of designs exists (for a summary of these studies, see O'Connor, Burt, VanHuysse, & Klump, in press), results have been mixed, and no such studies have focused on thin-ideal internalization as an outcome variable. Fortunately, there are methods to examine the role of socialization and selection effects indirectly using cross sectional data; most notably, the co-twin control design (McGue, Osler, & Christensen, 2010). Co-twin control studies compare outcomes in reared-together co-twins discordant on level of exposure to an environmental risk factor (Burt et al., 2010; McGue et al., 2010; Rubin, 2007). In order to infer the role of selection and/or socialization effects, the co-twin control model capitalizes on the common environmental and genetic background within twin pairs. Indeed, reared-together twin pairs are matched on shared environmental experiences (i.e., environmental influences that are common to co-twins such as age, socioeconomic status, and key sociocultural influences such as access to thin-focused media, parental focus on weight, etc.). Additionally, due to their genetic relatedness, twin pairs are entirely (in the case of identical twins) or partially (in the case of fraternal twins) matched on genetic predispositions. Thus, in the co-twin control design, shared environmental and genetic selection effects are controlled for, since twin-pair discordance in an exposure variable such as weight conscious peer groups cannot be explained by differences in genetic or shared environmental predispositions (McGue et al., 2010).

In order to determine whether selection effects are present, the co-twin control design utilizes comparisons of within-person effects and within-twin-pair effects. Within-person effects are analogous to traditional correlational designs because they examine associations between each individual twin's level of exposure to weight conscious peer groups and her own level of thin-ideal internalization. Within-twin-pair effects examine associations between discordance on degree of exposure to weight conscious peer groups and each twin's level of thin-ideal internalization. The within-twin-pair results in DZ twins are interpreted based upon genetic and environmental relatedness, as reared-together DZ twins share 50% of their genes and 100% of their shared environment. The within-twin-pair analyses in MZ twins provide the maximum control for selection effects, as MZ twins share 100% of their genes and shared environmental experiences. Indeed, since genetic and shared environmental selection effects are entirely controlled in MZ twins, a significant association between discordance in weight conscious peer group exposure and thin-ideal internalization in MZ twins cannot be due to genetic or environmental selection effects, and instead are explained by socialization effects (see Fig. 1, Scenario A).

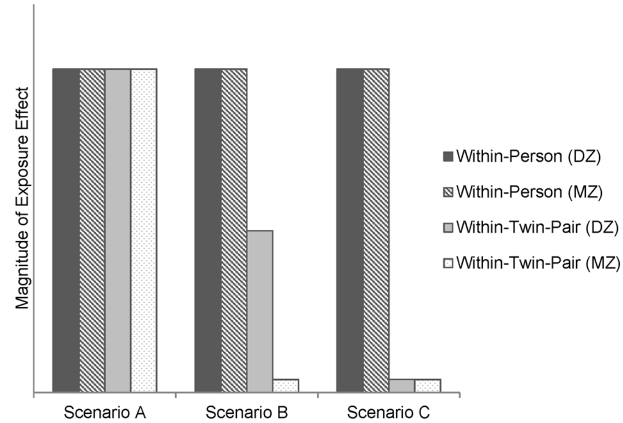

Fig. 1. Interpretation of results within a co-twin control design. Graph depicts hypothetical findings that would support Scenario A (socialization), Scenario B (genetic selection), or Scenario C (shared environmental and genetic selection *or* shared environmental selection only), as discussed in the text. For within-person effects, there are no expected differences between MZ and DZ twins regardless of role of socialization and/or selection, as these results are analogous to correlational results and do not control for any selection processes. For within-twin-pair effects, results in DZ twins control partially for genetic and entirely for shared environmental selection effects, while results in MZ twins control entirely for genetic and shared environmental selection effects.

Alternatively, when the association between level of exposure to weight conscious peer groups and thin ideal-internalization is small and not significant in discordant MZ twins, either genetic and/or shared environmental selection effects are suggested (see Fig. 1, Scenarios B and C), since levels of thin-ideal internalization within the twin pair are similar despite differential exposure to weight conscious peer groups. More specifically, Scenario B in Fig. 1 suggests genetic selection effects, since the association is attenuated *only* in MZ twins, where genetic selection effects are controlled for entirely, but remains significant in DZ twins, where genetic selection effects are only partially controlled. Scenario C in Fig. 1 suggests genetic and shared environmental selection effects, or shared environmental effects only, since an association is present only at the individual level, and is not present when genetic and environmental selection is partially or entirely controlled for (i.e., in MZ and DZ twins). Notably, when Scenario C is present, it is not possible to disentangle the specific role of shared environmental versus genetic selection effects. More specifically, Scenario C could emerge when *both* genetic and shared environmental selection is occurring, but Scenario C could also occur if only shared environmental selection is at play. For this reason, throughout the remainder of this manuscript, Scenario C is described as suggesting, "genetic and shared environmental selection or shared environmental selection only." However, Scenario C would not occur in the presence of only genetic selection, as this would be consistent with Scenario B. Unfortunately, since all twins within this sample were reared together, there are no comparisons within this model to identify purely shared environmental selection effects. Taken together, by comparing within-person effects (which do not control for selection effects), within twin-pair effects in DZ twins (which control for shared environmental selection and partially control for genetic selection), and within-twin-pair effects in MZ twins (which control for shared environmental and genetic selection), the co-twin control design allows for a test of socialization versus selection effects for thin-ideal internalization and weight conscious peer groups.

The present study aimed to investigate the role of socialization and selection effects in the association between exposure