AWE Assessing Women
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Overview: Psychological Sense of Community for Women in Engineering

Psychological Sense of Community (PSOC), a central concept from community psychology, provides a framework for understanding and assessing women's sense of belonging in the engineering environments of work, education, and, for students, residential life.

- The lack of feeling accepted in engineering as students and faculty has been a persistent barrier for women in engineering (Goodman & Cunningham, 2002; McIlwee & Robinson, 1992).
- PSOC for college students is associated with lower levels of "burnout," which is in turn associated with academic performance (McCarthy et al., 1990).
- PSOC is higher for students in the following groups: fraternity or sorority members, private school undergraduates, students living on campus, out-of-state residents, seniors and females, extroverted students, those attending smaller institutions (less than 10,000), and students with optimal levels of campus participation (DeNeui, 2003; Lounsbury & DeNeui, 1995; Lounsbury & Deneul, 1996).
- Students in most majors have higher levels of PSOC than those in engineering.

PSOC, while a psychological construct, is also a group-level phenomenon. It is an indicator of ongoing underlying issues ranging from individual social-cognitive processes (Valian, 2004) to institutional practices (Rosser, 2004). Women's psychological lives within the engineering environment cannot be disconnected from the social environment. In many ways, PSOC is akin to the research on "chilly climate" (Hall & Sandler, 1982; Sandler, Silverberg, & Hall, 1996; Heller, Puff, & Miller, 1985). While a "hostile climate" negatively impacts individual women's, so too may a low PSOC. Yet in neither case would the individual be targeted for analysis and intervention, but rather those groups and institutions perpetuating exclusionary practices.

Psychological Sense of Community for Women in Engineering

Psychological Sense of Community (PSOC) is a concept from community psychology originating with Sarason's (1974) *The psychological sense of community: Prospects for a community psychology*. Sarason asserted that PSOC should be a guiding factor for community psychologists. By the mid-1980s several researchers had developed indexes for measuring the PSOC, most notably McMillan and Chavis (1986), and several groups of researchers made exploring PSOC their agenda. One branch of investigation has focused upon PSOC in academic environments. A sense of social belonging has been identified as integral to the success of women in engineering (Goodman & Cunningham, 2002), but PSOC as defined in the field of community psychology has not yet been applied to women in engineering. This paper will define and elaborate upon the concept of PSOC as it pertains to women in engineering. Making this connection between two established but as yet unlinked lines of research is meant to facilitate access for Women in Engineering (WIE) program directors to psychology-based theory and instruments for program planning and assessment.

The lack of feeling and being accepted in engineering as students and faculty has been a persistent barrier for women in engineering (Goodman & Cunningham, 2002; McIlwee & Robinson, 1992), one with severe consequences in terms of disproportionately low numbers of women studying and practicing engineering (*Women, Minorities, and Persons with Disabilities in Science and Engineering*). It is well known that a great number of institutional, social, and personal factors interplay to generate feelings of alienation for women in engineering. Yet, developing indicators of a healthy environment can be difficult to define and assess. PSOC developed within the field of community psychology and offers a solid lineage of research and instruments from which to draw upon in operationalizing these feelings. To address one potential aspect of WIE assessment, this overview brings the issues of women in engineering together with the knowledge of community psychology.

Throughout this overview keep in mind that PSOC, while a psychological construct, is a group-level phenomenon. It is an indicator of ongoing underlying issues ranging from individual social-cognitive processes (Valian, 2004) to institutional practices (Rosser, 2004). Women's psychological lives within the engineering environment cannot be disconnected from the social environment. In many ways, PSOC is akin to the research on "chilly climate" (Hall & Sandler, 1982; Sandler, Silverberg, & Hall, 1996; Heller, Puff, & Miller, 1985). While a "hostile climate" negatively impacts women's individual lives, so too may a low PSOC. In neither case would one assign individual responsibility or interventionist focus to individual women, but rather to the system that supports exclusionary practices (McCarthy, Pretty, & Catano, 1990). PSOC, then, can be used as one measure of how well a whole system is working collectively to support the success of all of its members.

Psychological Sense of Community Definitions

The history of PSOC places it firmly at the center of community psychology, where it has remained a core concept for the past two decades. The following definitions provide some background regarding the concept's emergence within community psychology and the need to understand psychological engagement, both with communities of place and of interest. While women in engineering do of course live and work in geographic communities, communities of interest (work, academic, and student residential) will be focal points.

Community Psychology   Placed at the nexus that is "social psychology," community psychology maintains its orientation to interpersonal and intrapersonal experiences within the social and cultural context of "community." Community psychology is overtly interventionist and aims to provide unique insights into understanding and improving negative social conditions. With an influence on education, preventative

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interventions, health promotion, workplace, and community empowerment, this field "continues to hold out the possibility that settings can be designed which optimize the quality of life for their inhabitants". (Lorion & Newbrough, 1996, p. 311) Looking at women in engineering in terms of community psychology reveals three communities of interest: the undergraduate academic community, the undergraduate residential community, and the workplace community for faculty, as covered in the following sections.

Community

The definition of community is complex and not standardized; in fact, in 1964 Hillery identified 94 different definitions of community used in the literature (Hillery, 1964, as cited in Puddifoot, 1996). For the sake of this discussion, then, the definition of community will be limited to Sarason's (1974), who first conceptualized "community" as a complex and ever-changing set of geo-political, social and psychological interrelationships. Though each set of relationships has some characteristics in common, each is also unique, with a distinct history affecting present characteristics. The study of community is made up of these related issues for Sarason (1974),: "how complete a community is, the degree to which its parts are functionally related, the extent to which change in one part brings change in other parts, the sensitivity of a community to the facts and directions of change, [and] the relationships of change to alignments of power" (p. 131). Sarason asks that psychologists develop knowledge, if not expertise, on issues of "economics, taxation, resources, geography, political science, religion, and so on" (p. 7). While this paper cannot cover the entire vast body of literature on WIE, most or all of these components appear in the WIE research literature as having impact upon women's experiences.

Wiesenfeld (1996) argues that the construction of "community" has historically been homogenous; it has furthermore represented not only community members' perceptions of ideal communities, but what community members thought researchers wanted to hear. As such, the definition of community based on the literature is "a set of individuals who have built an identity from shared experiences and processes which homogenize them in regard to characteristics, actions, and perspectives" (p. 345). Rather than trying to negate the existence of communities for not conforming to the homogenous definition, Wiesenfeld instead echoes Sarason's call for complexity. Thus chaos and conflict are perpetual aspects of community that need not be ignored; indeed, a "we," Wiesenfeld notes, "needs to be understood in its context as an ever-changing network marked by continuous inclusions and exclusions (p. 341)." Puddifoot (1996)

makes a similar argument calling for PSOC to be understood as an analytic concept rather than a measurable phenomenon. Community would then concern "the perception and expression of ideas about a particular community by its residents at a specific time". (Puddifoot, 1996, p. 329) From this perspective, research questions would originate with individuals' views about their community but also with reference to more widely employed dimensions. This approach is consistent with the gender equity literature addressing the academic "climate," in which power imbalances are pervasive and various members of the community simultaneously experience different levels of acceptance. (Bergvall, Sorby, & Worthen, 1994).

Psychological Sense of Community

Psychological sense of community (PSOC) is a central concept within the field of community psychology. Sarason (1974, p. 4) is credited with placing PSOC at the forefront with his frequently cited claim: "I regard the psychological sense of community as the overarching criterion by which to judge any community effort." By this, he meant "the sense that one was part of a readily available, mutually supportive network of relationships upon which one could depend and as a result of which one did not experience sustained feelings of loneliness that impel one to actions or to adopting a style of living masking anxiety and setting the stage for later and more destructive anguish" (Sarason 1974, p. 1). Sarason explains that the prominence of the concept evolved during a time of crisis both in community life and in the university during the late 1960's and early 1970's. Psychological sense of community seeks to address the collective rather than individual experience that had dominated psychology – even social psychology – to that point. Although Sarason was the first and most passionate rhetorical advocate of PSOC as central to community psychology, McMillan and Chavis (1986) are best known for furthering the theory.

McMillan (1976) defines sense of community as "a feeling that members have of belonging, a feeling that members matter to one another and to the group and a shared faith that members' needs will be met through their commitment to be together." McMillan and Chavis (1986) elaborated on this by way of four interacting elements: *membership, influence, need fulfillment* and *shared emotional connection*[1]. *Membership* itself is composed of five attributes that work together to determine who is and who is not part of a group. These are: boundaries, emotional safety, a sense of belonging and identification, personal investment, and a common symbol system. *Influence* is bidirectional; that is, members must simultaneously perceive that they exert influence upon the group while conforming to group influences. Influence serves to attract members, strengthen bonds among them, validate members' beliefs, and indicate cohesiveness. *Need fulfillment* is interpreted in terms of behaviorism as "reinforcement." Reinforcers may include group competence, success and status, all of which are given direction by a shared sense of values. The fourth attribute is *shared emotional connection*. Based in part on shared history, emotional connection is facilitated by frequent positive interpersonal interaction within the community (including honor rather than shame), shared experience and closure of important events, and spiritual bonds. In 1997 the Society for Community Research and Action debated whether PSOC is best conceptualized as cognition, a behavior, an individual affective state, and environmental characteristic or a spiritual dimension – with no resulting consensus (Chipuer & Pretty, 1999). The body of research on the subject, as well as the original theories would indicate that PSOC is a holistic concept resulting from the combination of all of the above.

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[1] McMillan (1996) later reconceptualized each of these four components as Spirit, Trust, Trade and Art in an elegant retrospective essay. Consequent research stuck with the original conceptualization, however. For simplicity this paper will also use the original categorizations.

Complementary to the work on PSOC is Puddifoot's (1996) definition and analysis of "community identity." Since the definitions used by researchers of "community identity" and PSOC have not been uniform and have some overlap, generalizations applying to "community identity" seem equally relevant to PSOC. Puddifoot (1996) identified two important elements of community as 1) perceived distinctiveness of the community and 2) the strength of identification with that community. Here, definitions are offered (p. 332):

> ***Distinctiveness*:** the measurable extent to which the community is perceived to be separate and different from other communities in its territorial and/or social features.

> ***Identification:*** a perceived sense of affiliation, belongingness, and emotional connectedness to a physically delineated area or to characteristic social forms or practices of its members.

These two themes are prominent in what Puddifoot has identified as the 14 dimensions of community identity. These are provided to account for the many variations found in the research, each of which may emerge as more or less relevant to a given project.

Table 1: Dimensions of Community Identity

Dimension 1	Members' own perception of boundaries, and key topographical/built featured of their community
Dimension 2	Member's own perceptions of key social/cultural characteristics of their community
Dimension 3	Members' own perceptions of the degree of physical distinctiveness of their community
Dimension 4	Members' own perception of the degree of key social/cultural characteristics of their community
Dimension 5	Members' own perceptions of the special character of their community.
Dimension 6	Members' perceptions of their own affiliation/belonging/emotional connectedness to location.
Dimension 7	Members' perceptions of their own affiliation/belonging/emotional connectedness to social/cultural groupings/forms.
Dimension 8	Members' perceptions of others' affiliation/belonging/emotional connectedness to location.
Dimension 9	Members' perceptions of others' affiliation/belonging/emotional connectedness to social/cultural groupings/forms.
Dimension 10	Members' own reasons for identification (or not) with the community.
Dimension 11	Members' own orientation to their community.
Dimension 12	Members' own evaluation of the quality of community life.
Dimension 13	Members' perception of others' evaluation of the quality of community life.
Dimension 14	Members' own evaluation of community functioning.

Source: Puddifoot, J. E. (1996). Some initial considerations in the measurement of community identity. *Journal of Community Psychology, 24*, 335-336.

       Puddifoot (1996) suggests that these 14 dimensions may be used for structuring future research, particularly across disciplines, in order to parse out generalizeable and unique features of community life. In terms of gender differences in perception of community identity, clear applications for WIE research emerge.

Measurements

By 1996, there were nearly 30 articles that sought to measure PSOC, five of which were based on factor-analytic approaches (see Table 2, Hill, 1996). In addition to these studies, a number have been generated by the theory developed by Mcmillan and Chavis (1986) (see Table 2). To avoid confusion, a brief history is in order. Doolittle and MacDonald (1978) first developed the Sense of Community Scale (SCS), which differentiated between low, medium, and high SCS neighborhoods for five factors: informal interaction, safety, pro-urbanism, neighboring preferences, and localism. Next, Glynn (1981) produced the Psychological Sense of Community Scale, which consists of 60 questions in three categories: demographic data, attitude and behavior statements, and awareness and competence. Despite the promise of their titles, neither of these scales gained significant popularity or influence. Although Sarason (1974) called for centralizing the construct in community psychology in early 1970's, the contemporary history of measurement did not begin in earnest until the mid 1980s, with the frequently used Sense of Community Index (SCI) (Perkins, Florin, Rich, Wandersman, & Chavis, 1990) based on the model developed by McMillan & Chavis (1986). This is not to be confused with the 46-item Sense of Community Profile actually developed by Chavis and colleagues (Chavis, Hogge, Mcmillan, & Wandersman, 1986). From the SCI (Perkins et al., 1990) emerged the Brief Sense of Community Index (BSCI) (Long & Perkins, 2003) with only fifteen items and three categories: Social connections, mutual concerns, and community values. The BSCI is the most recently published in this lineage. The following two tables group the major indices according to Hill's (1996) observations of those derived from factor analysis and then again according to those derived from McMillan & Chavis' theory (1986).

Table 2: Factor Analytic Studies of Psychological Sense of Community

Psychological Sense of Community Scale Glynn, T. (1981). Psychological sense of community instrument. *Human Relations, 34*(7), 789-818.
Factors: Objective evaluation of community structure, supportive relationships in the community, similarity and relationship patterns of community residents, individual involvement in the community, quality of community environment, and community security.
Sense of Community Scale Doolittle, R. J., & MacDonald, D. (1978). Communication and a sense of community in a metropolitan neighborhood: A factor analytic examination. *Communication Quarterly*, 26, 2-7.
Factors: Supportive climate, family life cycle, safety, informal interaction, neighborly interaction, localism
Untitled Riger, S., & Lavrakas, P. (1981). Community ties, patterns of attachment, and social interaction in urban neighborhoods. *American Journal of Community Psychology, 9,* 55-66.
Factors: Social bonding and physical rootedness

Untitled
Buckner, J. (1988). The development of an instrument to measure neighborhood cohesion. *American Journal of Community Psychology, 14*, 24-40.
Factors: Cohesion
Untitled
Davidson, W., & Cotter, P. (1986). Measurement of sense of community within the sphere of city. *Journal of Applied Social Psychology, 16*, 608-619.
Factors: Sense of community

Derived from: Hill, J. L. (1996). psychological sense of community: Suggestions for future research. *Journal of Community Psychology, 24*, pp. 431-438.

Table 3: Measurements Derived from McMillan & Chavis (1986)

Sense of Community Index (SCI)
Perkins, D. D., Florin, P., Rich, R. C., Wandersman, A., & Chavis, D. M. (1990). Participation and the social and physical environment of residential blocks: Crime and community context. *American Journal of Community Psychology, 18*(1), 83-115.
Sense of Community Profile
Chavis, D. M., Hogge, J. H., Mcmillan, D. W., & Wandersman, A. (1986). Sense of community through Brunswick's lens: A first look. Journal of community psychology, 14(1), 24-40.
Brief Sense of Community Index
Long, D. A., & Perkins, D. D. (2003). Confirmatory factor analysis of the Sense of Community Index and development of a Brief SCI., *Journal of Community Psychology, 31*, pp. 279-296.

Derived from: Hill, J. L. (1996). Psychological sense of community: Suggestions for future research. *Journal of Community Psychology, 24*, pp. 431-438.

Chipuer and Pretty (1999) reviewed the short form of the Sense of Community Index (Chavis et al., 1986) in terms of the four dimensions of PSOC provided by McMillan and Chavis (1986): membership, influence, need fulfillment and shared emotional connection. They found reliability for the total SCI scores ranged from .64 to .69, but most subscale reliabilities were unacceptable. Factor analyses showed some support for the four dimensions but were not consistent across data sets. Overall, they found support that the items on the SCI can provide a foundation for scale development based on the McMillan and Chavis model. This is consistent with their suggestion that researchers focus on the connection between theory and measurement of existing theories rather than the perpetual generation of new scales ungrounded in theory. They do suggest that the measure be considered unidimentional until the subscales are either reformulated or expanded (in number or in response range). This analysis was followed by that of Long and Perkins (2003) of the Sense of Community Index using confirmatory factor analysis, which they say is the proper evaluation tool, rather than that used by Chipuer and Pretty (1999). Their findings yielded "poor model fit" for McMillan and Chavis's theory. They suggest possible reasons: 1) dimensions vary from place to place and/or change over time; 2) measurement may not accurately reflect McMillan and Chavis' aim; 3) dichotomous response options constricted sensitivity; or 4) the original SCI included items that measured other constructs. But rather than abandon the SCI, they developed the cognitive-perceptually based Brief SCI (BSCI) with a good model fit but marginal internal reliability. They

recommend that future use of their BSCI include a 5-point response format to increase sensitivity and continued testing.

Although instrument development and testing for PSOC is prolific, creating a high-quality instrument is challenging for many reasons. PSOC is a multilevel construct (Kingston, Mitcheh, Florin, & Stevenson, 1999; Puddifoot, 1996): diversity is inherent (Wiesenfeld, 1996); PSOC is related to personality factors (Lounsbury, Loveland, & Gibson, 2003) and social climate (Pretty, 1990); people function in multiple communities of varying salience at any given time (Brodsky & Marx, 2001); and PSOC is relationally defined and constantly changing on an individual basis (Hill, 1996). These reasons should be taken into consideration whenever revising or developing instruments.

The core body of PSOC research has generally focused on geographically defined communities of residence. Academics, students, and professional engineers are certainly members of these communities, but the broader community is not of primary importance here. While maintaining an awareness of the general PSOC theories and scales as the foundation for more microlevel community climates, we will focus on three communities most relevant to WIE: academic, workplace, and residential sense of community.

Academic Sense of Community

Nurturing a sense of community on campus is a time-honored tradition. A high PSOC for college students is associated with lower levels of "burnout," which is in turn associated with academic performance (McCarthy et al., 1990). PSOC is higher for students in the following groups: fraternity and sorority members, private school undergraduates, students living on campus, out-of-state residents, seniors and females, extroverted students, those attending smaller institutions (less than 10,000), and students with optimal levels of campus participation (DeNeui, 2003; Lounsbury & DeNeui, 1995; Lounsbury & Deneul, 1996). Lounsbury and DeNeui (1995) also found that students in most majors had higher levels of PSOC than those in engineering. In addition, a theme running throughout the literature on women in engineering has been the struggle for a sense of belonging. Its absence is credited as a source for women's leaving (Seymour, 1995) and its presence as a source for the decision to persist (Goodman & Cunningham, 2002). Several aspects of the engineering education may contribute to an unwelcoming atmosphere. Among them are peer relationships (Felder, Felder, Mauney, Hamrin, & Dietz, 1995), educational strategies (Rosser, 1997) and social climates (Bergvall et al., 1994) that are simply incompatible with the elemental necessities of PSOC[2]. At the same time, many WIE programs actively and successfully work to change this by creating a sense of community for their female students (see *New Formulas for America's Workforce: Girls in Science and Engineering*, 2003 for numerous examples).

Assessments resources for academic sense of community include:

- Lounsbury, J. W., & DeNeui, D. (1995). Psychological sense of community on campus. *College Student Journal*, *29*, 270-277.
- Lounsbury, J. W., & Deneul, D. (1996). Collegiate Psychological Sense of Community in Relation to Size of College/University and Extroversion. *Journal of Community Psychology*, *24*, pp. 381-394.

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[2] Holland (1997) would make the case that the profession of engineering attracts and retains a certain "personality type" in a self-perpetuating cycle wherein a small number of the general population is attracted to the work of engineering as well as to the people who do the work. Research has not been conducted that directly demonstrates an inverse relationship with the culture of engineering and the factors that increase levels of PSOC.

- Lounsbury, J. W., Loveland, J. M., & Gibson, L. W. (2003). An investigation of psychological sense of community in relation to Big Five personality traits. *Journal of Community Psychology, 31*, pp. 531-541.
- Russell, D., Peplau, L., & Cutrona, C. (1980). The revised UCLA loneliness scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology, 39,* 472-480. As the title indicates, this scale assesses loneliness rather than sense of community. It may serve as a useful complement in a research endeavor.

Workplace Sense of Community

PSOC has been studied in the context of the workplace (PSOCW). For working students, faculty, and practicing engineers, this aspect is relevant to the day-to-day life. Research has indicated that PSOC in the workplace can increase feelings of security, strengthen self-concept and self-respect, and improve coping abilities (Klein & D'Aunno, 1986; Pretty & McCarthy, 1991). Some differences may exist based on race and gender. Lambert & Hopkins (1995) collected data from men and women in lower-level manufacturing jobs. They found that well-designed jobs and supportive workplace relationships and policies improve PSOCW. Formal support contributed more to women's PSOCW while informal support was more influential for men's PSOCW. African-American women and men expressed lower levels of PSOCW. More specifically, PSOCW was improved when promotions were fairly allocated, jobs were challenging, worker interaction was encouraged, and mastery of job skills was possible (Lambert & Hopkins, 1995).

PSOCW has been defined by Buroughs & Eby (1998) both as "a geographic locality and as formal and informal networks of individuals who share a common association" (p. 510). PSOCW is made up of coworker support, emotional safety, sense of belonging, spiritual bond, team orientation and truth telling. Burroughs and Eby (1998) provide operational definitions of these dimensions in the table below:

Table 1. Definitions of the Dimensions of the Initial Psychological Sense of Community Scale

Name of Dimension	Definition
Coworker Support	Occurs when members of the workplace community are willing and eager to help one another complete a project; aid one another through personal problems; and use humor as a way of reflecting acceptance of others' flaws.
Emotional Safety	Occurs when members of the workplace community know how they can count on one another and on their leaders for support and honesty which inspires feelings of mutual trust and security.
Sense of Belonging	Occurs when members of the workplace community identify with one another and have feelings, beliefs, and expectations that they fit in the organization and have a place there.
Spiritual Bond	Occurs when members of the workplace community find ways to embody or invoke guiding principles based on spirituality, ethics, and values which in turn translate into daily actions and decisions.
Team Orientation	Occurs when members of the workplace community are engaged, involved, and mobilized until there is a group who moves together with a clear, shared vision and overall strategy in common.
Truthtelling	Occurs when members of the workplace community openly and honestly respond to one another; actively listen to each other's concerns, hopes, and fears; resolve conflicts; express emotion; and do not say only what they feel others want to hear.

Source: Burroughs, S. M., & Eby, L. T. (1998). Psychological sense of community at work: A measurement of system and explanatory framework. *Journal of Community Psychology, 26*(6), 509-532.

Burroughs and Eby (1998) used this definition to develop and test a measurement instrument for PSOCW. Both the scale items and the testing results are available in their article. Assessment resources for workplace sense of community include those provided by:

- Burroughs, S. M., & Eby, L. T. (1998). Psychological sense of community at work: A measurement of system and explanatory framework. *Journal of Community Psychology*, *26*(6), 509-532.
- Royal, M. A., & Rossi, R. J. (1996). Individual-level correlates of sense of community: Findings from workplace and school. *Journal of Community Psychology, 24*(4), 395-416.

Campus Residence Sense of Community

PSOC in relation to residence has been the central focus of PSOC research in terms of neighborhoods and towns. While women in engineering are, of course, members of larger communities which interact among each other (Brodsky & Marx, 2001), the focus here will be on residential experiences of pre-college students and college students in dormitories. Women in engineering programs have taken advantage of residential programs both for pre-college summer programs (Atwater, Colson, & Simpson, 1999) and for undergraduates (Allen, 1999) (for more examples, refer to: *New Formulas for America's Workforce: Girls in Science and Engineering*, 2003). Such programs seek to fulfill a number of goals, including fostering a sense of community that in turn, increases the chances of academic and professional success in engineering.

In general, students living on-campus have higher PSOC than those who do not (J. W. Lounsbury & D. DeNeui, 1995). PSOC developed within a dormitory setting may result in greater engagement with other campus groups including faculty, and also in higher levels of persistence (Berger, 1997). PSOC is characterized by perceptions of similarity and interdependence as well as by a shared sense of external academic expectations (Pretty, 1990). At the University of Wisconsin-Madison, the Women in Science and Engineering Residential Program (WISE-RP) was initiated to solve the problems of isolation, lack of female role models, chilly classroom climate, and low self-confidence. The program used several intervention strategies, including same-sex residence halls. Researchers found that the students living in the residence hall had better grades and a higher level of general satisfaction at the university. Tellingly, residents were unable to separate their perceptions of academic and residential life, creating a "thriving out-of-classroom academic community" (Allen, 1999, p. 272). The physical design of dormitories may also contribute to the level of PSOC. Facilities with large common areas for whole-dorm interaction contribute to higher PSOC than buildings that are subdivided to separate and contain smaller groups (Hill, Shaw, & Devlin, 1999).

Assessment resources for residentially-related sense of community on campus include:
- Moos, R., & Gerst, M. (1974). *University Residence Environment Scale Manual.* Paulo Alto, CA: Consulting Psychologists Press.
- Moos, R. (1987). *The Social Climate Scales*. Palo Alto, CA: Consulting Psychologists Press.
- Berger, J. (1997). Students' sense of community in residence halls, social integration, and first-year persistence. *Journal of College Student Development*, *38*(5), 441-453.

Conclusions

Psychological Sense of Community is a psychological construct that may be used to operationalize and assess aspects of group work and living. Those who are concerned with increasing the numbers of women succeeding in engineering are well aware of the problems associated with social exclusion within the classroom, industry, and faculty positions. The purpose of this paper has been to bring awareness to the WIE community of the relevant work from community psychology. The theoretical background and existing measurement instruments for PSOC have undergone a high level of academic discussion and scrutiny in the community psychology journals. WIE directors may reference the sources provided in this document to utilize existing resources or to adapt and develop new instruments unique to their circumstances. In doing so, measurements can be developed that provide an indicator of the overall level of functioning a given community offers for its members.

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