# SOCIAL DOMINANCE THEORY: INTRODUCING PROFESSOR JIM SIDANIUS TO THE BRAZILIAN SOCIAL PSYCHOLOGY COMMUNITY

TEORIA DA DOMINÂNCIA SOCIAL: APRESENTANDO PROFESSOR JIM SIDANIUS À COMUNIDADE BRASILEIRA DE PSICOLOGIA SOCIAL

TEORÍA DE LA DOMINANCIA SOCIAL:
PRESENTANDO EL PROFESOR JIM SIDANIUS A LA COMUNIDAD
BRASILEÑA DE PSICOLOGÍA SOCIAL

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I had been chatting by e-mail with Professor Jim Sidanius (also known as James Sidanius) for about a year before we met in the US. In February 2018, I finally met him in person. I was so excited to get to know the person who accepted me for post-doc studies. I was going to be at Harvard University mentored by this famous professor who developed one of the most well-known modern theories in social psychology - the Social Dominance Theory (SDT)!

I stepped in front of the James Hall Building¹ - the tallest construction around Harvard Yard. It looked like a dream of mine had come true. The building had a "cold" appearance, looking like a giant block filled with chromosomes. I realized I was content, but very nervous as well. Professor Sidanius' office is on the 14th floor, with such a nice view of Cambridge and the skyline of Boston's Financial District. I knocked on his door and there he was, a very tall Afro-American man that received me so kindly. His tone of voice, so tender, quickly made me feel comfortable.

It took me 10 months to get an interview with professor Jim (from the moment I started my post-doc); not only because he is a very busy person, but because I needed time to get acquainted with his theory, with his thoughts and manners, in order to be able to conduct the best possible interview. I was confident that the Brazilian Psychology community should start to get to know this great researcher and his theory. The interview took place in two parts. We began the interview during the Course "Psychology of Prejudice and Racism" on November 8th, 2018, and we finished it in his office on December 21th, 2018<sup>2</sup>.

Professor Jim Sidanius received his Ph.D. from the University of Stockholm, Sweden, and he is presently the John Lindsley Professor of Psychology in memory of William James and of African and African American Studies in the departments of Psychology and African and African American Studies at Harvard University. His primary research interests include the interface between political ideology and cognitive functioning, the political psychology of gender, group conflict, institutional discrimination and the evolutionary psychology of intergroup conflict. He has authored and published more

than 330 scientific papers, but the most well-known scientific writing is the book "Social Dominance Theory. An integration theory of social hierarchy and oppression" (Sidanius & Pratto, 1999), not yet published in Brazil or in Portuguese<sup>3</sup>.

The SDT is a general model of the development and maintenance of group-based social hierarchy and social oppression. Usually, it is a theory associated with the Social Domination Orientation Scale (SDO Scale)<sup>4</sup>.

The theory is embedded within Critical Social Psychology, centering its attention on power relations, particularly racism and sexism. The STD works with the insights gleaned from social-structural and elite theories, including Marxism, the evolutionary perspective, and the political psychology of patriarchy.

Professor Sidanius was an American protester against the war in Vietnam, and he decided to leave the US because he wasn't satisfied with the political decisions in his country. He traveled to Canada, then Algeria, France, and finally Sweden. He became a refugee in Sweden for fourteen years. He gave up his American citizenship, and he decided that he wanted to have a new identity. Sidanius is an "artificial" name. Brown, the name he originally had, was the name of the slave owner who had "owned" his family, so he decided he wasn't going to keep that name. He wanted to have the name of Uhuru, which means "freedom" in Swahili, but Sweden didn't allow names like that, because they were too difficult for Swedes to understand and pronounce. The way he could legally change his name was to go through the Royal Patent Office in Stockholm and pick out a name that was computer generated. There was a Gigantic book of names which was available, and Sidanius was the name he found the least ugly. So, now there are only four Sidanius in the world: his self, his son, his present wife, and his ex-wife.

In Sweden, Professor Sidanius had American friends that were there under similar circumstances. They were resisters against the war in Vietnam, or civil rights activists, or Black Power activists<sup>5</sup>. There was a small, American, expatriate community in Stockholm, and they used to hang out together sometimes. He also told me that he socialized with the Black Panthers<sup>6</sup> when he lived in Algeria. There was a period when Eldridge Cleaver and his wife Kathleen Cleaver who were Black Panthers were in Algeria, and Professor Sidanius would hang with them sometimes, but he didn't have too much to do with them. He believes they weren't behaving correctly, so the Algerian government eventually kicked them out of the country.

After fourteen years of living as a refugee in Sweden, Professor Sidanius returned to the U.S. for a two-year post-doctoral fellowship at Carnegie-Mellon University. Upon finishing his fellowship, he received a job offer from the University of Texas at Austin, where he worked for 3 ½ years. Afterwards, he worked for New York University. Years later he taught at UCLA, where he stayed for many years.

To come back to his home country was, to a certain degree, a relief, because he was back in his mother culture. He realized how American he was, and he got to see his family and friends again for the first time in a long time. But he noticed things had changed in the U.S. It wasn't quite as racist as it had been when he had previously lived there. America had decreased its level of racism, but it was still discernible, it was still there, except much milder, he observed. His experience of seeing the same thing, yet different, prompted him to write and develop the Social Dominance Theory, because although things had improved, the structures of relationships between ethnic groups in the United States were still very much the same, with Whites on top and African Americans on bottom.

The distance between them wasn't that great, but the facts, the pyramidal structure of the relationship was still the same, he emphasized. Legal discrimination was gone, the segregation laws, the Apartheid laws were no longer in place, but people still lived in Apartheid even though in wasn't du jour Apartheid, it wasn't du jour oppression, but it was socially accepted oppression. In that sense, nothing had really changed, in his opinion. What he experienced was the sameness of the change. America had changed, but it hadn't change, he said: "Plus les choses changent, plus les choses restent les mêmes," the more things change, the more things remain the same, he argued.

## On social dominance: some theoretical queries

AR: One positive aspect of your theory is that you move away from the perspectives that pathologize "deviance." The SDT is interested in explaining the interconnections between different levels of group relations. SDT provides theoretical tools to explore attitudes within and between social groups, without forgetting to account for individual differences. Correct me if I am wrong, the SDO scale measures how oriented an individual is towards dominance. What are the potential risks associated with this scale being applied to pathologize people?

**JS:** Unlike the Authoritarian Personality Theory, there is no component in the SDT of something being bad or good. High levels of inequality are no more morally suspect than low levels of inequality. It is not a normative theory, but a descriptive theory. Just like I wouldn't get angry at a rattlesnake that bit me, and caused me to die, I wouldn't say that is a bad snake, the snake is simply doing what snakes do. There is no moral patina put on those behaviors, it is not a normative theory at all.

AR: But someone can use the scale to judge someone...

JS: Only if they misapply the theory. The SDO scale is not trying to separate "good" people from "bad" people, or "enlightened" people from "unenlightened" people, it is really important to distinguish people who like high hierarchy and propose hierarchy, from people who don't like high hierarchy. It is sort of used to differentiate between people who want to see hierarchical group relations versus equalitarian group relations. But hierarchical versus egalitarian group relations have no moral implications. (...). You cannot give people the SDO scale and then say to them "you are a bad person", or "you are sick", or "you are inadequate".

**AR:** But can you say the person has a high or low tendency to dominate someone?

JS: No, it is not about personal dominance. We have to make a distinction between two kinds of dominance: personal dominance and intergroup dominance, whether the individual wants to dominate himself or herself, or whether the individual wants to dominate other individuals. Social dominance at the intergroup level can indicate that an individual, as a member of a social group, wants to see hierarchical relationships between groups, even if they have personally suffered as a result of these hierarchies. So very poor people, let's take the working-class supporters of Donald Trump... A lot of them support Trump not because they personally want to get ahead, but because they think it is better that good people, intelligent people have more power and resources than less intelligent people. But it is not at the personal level; it is about what kind of group relations they want to see in society. So that's an important distinction we make in SDT between interpersonal and intergroup dominance.

AR: How can SDT explain cooperation, instead of only explaining competition?

JS: We are a social species. Sociality is a characteristic that is genetically inherited by human beings, which has advantages not only in terms of protection of certain groups against other groups, but also for hunting. A single man cannot hunt large game alone; he has to hunt in a group. Group cooperation is a practice that humans adopted through adaptation to the environment and thus, humans developed a tendency to form cooperative groups. Men, singly and in groups, engage in warfare, and other forms of intergroup conflict, for access to economic (e.g., hunting and fishing grounds) and social resources (social status, including women) to a significantly greater degree than do women. When people think about out-groups, thoughts about out-groups are generally gendered thoughts, they think about males of the out-groups as though they are the most dangerous and the most active. Females don't engage in imperialistic enterprises against other groups by themselves.

In addition, compared to females, males can optimize their reproductive fitness by engaging in intergroup conflict over economic and symbolic resources. The greater males' access to economic and social resources, the greater their sexual access to reproductively capable women and the greater their reproductive fitness will be, ceteris paribus ["all other things being equal"]. Among women reproductive fitness is not as directly tied to one's sexual access to economics and social resources, and the subsequent increased access to reproductively capable mates. reproductive fitness is not dependent upon the number of sexual partners to have access to. One or two mates will generally be sufficient to achieve optimal reproductive success. Thus, among females, the more they compete physically in dangerous situations for social values, such as power, status and money, the less fit they will generally be because these activities are quite dangerous. For males, this increased risk accompanying intergroup conflict is simply part of the cost of doing business, high levels of risk taking, is part of what men they do in order to accumulate power, wealth, and status. Women are more risk averse than men are. Men engage in a lot of very risky behaviors, especially if they are located at the lower rungs of the hierarchy, is generally not the means to optimize reproductive. Thus, men will engage in robbery and murder and intergroup violence to a greater degree than will women. For males, the point of engaging in these risky behaviors is to accumulate social resources so that they can attract mates.

AR: If ethnic discrimination and in-group favoritism are "means by which genetically related organisms aid in the duplication of their common genes" (Sidanius & Pratto, 1999, p. 28), why would men rape women from a distant tribe or population? Are the "complementary resources" (p. 28), sufficient to explain it? How would you explain why so many soldiers go to war and don't rape any women?

JS: The theory does not say that men try to rape women because they are genetically related to one another. There are two problems with this. One is that there is such a thing in evolutionary psychology called "inclusive fitness", which means that an individual behaves in such a way that will benefit people who are genetically closely related to him. We don't try to explain in-group favoritism on the basis of "inclusive fitness". We don't think that theory is adequate to explain the loyalty that people demonstrate for large numbers of other people who are not related genetically to them at all. There is a kind of circuit or mechanism in the human mind which says, "I will benefit my brothers and sisters", even though in reality people are not particularly genetically related, but the individual is fooled into thinking that there is some kind of genetic connection between themselves and others through the use of the language: fatherland, motherland, brothers and sisters. This kind of behavior contributes to the enlargement of the power base of the ingroup by incorporating others and bringing them into the group. Groups benefit from being large

and ferocious, but not necessarily by strictly following principles of inclusive fitness. In other words, inclusive fitness as a mechanism in and of itself is not likely sufficient to explain in-group beneficial behavior or altruism. Maybe bees behave according to inclusive fitness, but human don't seem to be driven by that, because we will sacrifice our lives for people that are not related to us at all, and war is a good example of that. I agree with you in not using that mechanism of inclusive fitness to explain cooperative behaviors beyond a certain limited range.

AR: You argued that "there is reason to believe that people are born with different 'temperamental predispositions' and 'personalities,' and one predisposition is empathy (Sidanius & Pratto, 1999, p. 49). Could you clarify what you mean by "predisposition?" That's one question. The other question related to that is, if we consider that a more empathic person will tend to be less racist, can we infer that there is a predisposition (a genetic seed?) for racism?

JS: Yes, I think you could say that. There is a predisposition that people have for dominance. Some people are very tuned in to the emotional conditions of other people and are highly empathic. That level of empathy is likely genetic, some people have more than others. This is related to people's social and political ideologies as well. To a certain extent, liberals and conservatives are predisposed from childhood to have certain political and social values and attitudes. We theorize that, to a significant extent, social dominance orientation, the desire to form hierarchically organized social systems is, in part, heritable.

AR: But if it is genetic, we cannot change....

JS: That doesn't mean that. I know people are tempted to draw that conclusion, but it doesn't necessarily follow. If we know we are genetically predisposed to dislike certain people, we can compensate for that by being aware of our feelings towards others, by having laws that prohibit discrimination, right? There are structural, institutional norms which can mitigate this tendency to dominate and oppress others. It's sort of like the thinking behind the American Constitution and the division of power. It is structured so that no power of government can dominate the entire country. There is this three-way division among the legislature, the judiciary, and the executive branch. All are co-equal branches of government, and all serve as checks against the usurpation of power by one branch over the others. You can see the same kind of possibility for social oppression. There will be people who are aware of this tendency to dominate others, and form institutions that will soften or attenuate those natural tendencies.

**AR:** I have a hard time accepting this genetic approach, don't take me wrong, but why would people that have this tendency have the desire to change it if it is genetic?

JS: Values are different from predisposition. People can value democracy and equality as principles, as goals, as targets of life, even though they don't live up to those behaviors in natural life, in their ordinary existence. It is like being a Christian, turning the other cheek when you are struck on one side. Very few people can live up to that value, but by endorsing the principle we strive towards that as a goal. Some people have those goals in their minds, they would like to be democratic, accepting, and tolerant, but others don't have those goals. For those who do have those goals, they have this constant struggle to maintain fairness and to treat other people with kindness and tolerance.

AR: How can we, as psychologists, help people construct their goals in this way?

**JS:** Goals are basic values. Either you have values of equality and fairness, or you don't. The issue is if you have these values, how do you achieve the realization of these goals. There are institutional ways of achieving them, such as passing and enforcing anti-discrimination laws,

not tolerating bullying in schools, having quotas for minority groups in positions of power, or for women to constitute 50% of the legislature, or instituting laws to mandate that. Those are institutional ways to try to guarantee fairness and equality, but there is always a constant battle between high hierarchy-enhancing predispositions and their exact opposite. The battle is never won. It is a constant juggling back and forth between these two social forces.

## **Violence and Criminality**

AR: I have to tell you that what fascinated me and made me decide to contact you to be my mentor was the way you wrote that beautiful article (below). I hope in the future not so long from today you give a rest to empirical work and write about dominance and agency (an aspect considered by the SDT but barely touched by you), from your personal experience. Your personal narrative proves to me that there's no way a theory can be separated from its creator!

> I was arrested, beaten, jailed and arraigned for multiple acts of insubordination: insubordination for the crime of having a White girlfriend, insubordination for the act of questioning the legitimacy of my arrest, and most critically, insubordination for defending myself against physical attack by the police. By being told to 'show more respect for the law,' I was clearly being told to keep my place, or else. This critical event led to a visceral understanding of the role the police and other armed authorities play in maintaining generalized submission and acquiescence from Black people in the U.S. Although this was the last time, I was personally subject to police violence, I witnessed this kind of violence across many societies. The direct and vicarious experience of police violence influenced the development of SDT many years later. (Sidanius & Pratto, 2012, p. 421)

JS: That's true and that was probably a singular event in my life when I was beaten and arrested by the police for no good reason.

**AR:** And then we have this beautiful theory! The Social Dominance Theory.

**JS:** So, the police are responsible for the development of the theory.

[Laughs]

AR: You didn't cooperate with the police... One assumption the SDT makes is that subordinates cooperate with the dominants in their own oppression...

JS: The dominant group will act more in their own self-interest than members of subordinate groups. Subordinate groups will cooperate with the dominants. An example of this, taken from American history, is Uncle Tom's where the oppressed often cooperate and collaborate with the slave master in order to keep other African Americans in their place. A second example of this kind of Uncle Tom's in a different context is the behavior of the Kapos<sup>8</sup> in German concentration camps. Basically, what the theory says is that you really cannot have a stable hierarchy, that it's not possible, unless the subordinates cooperate to some extent. That doesn't mean, like in system justification theory, that the subordinates endorse the system to a greater degree that the dominants, but they will endorse it enough that they will get along with their oppressors. Without that you cannot have stable systems of hierarchy. Another example of behavior asymmetry is in health care. Poor people use alcohol more, they eat junk food more, they have unhealthy lifestyles more often...

**AR:** My theory is that this is cultural and an economic problem. Poor people, for example, eat more junk food because it is less expensive. My experience in the U.S. as an immigrant regarding eating habits tells me something interesting. In Brazil I tend to eat organic food, and here I cannot afford to eat very healthy all the time. There are other factors that interfere in behaviors, cultural and economic factors for example.

JS: But even beyond diet, which is partially explained by the fact that healthier food is generally more expensive, are risky behaviors like smoking and drug use, which are practiced at higher rates among subordinates than among dominants. You go down the list of self-harming behaviors, those self-harming behaviors are more likely to be engaged in by members of subordinate groups than by members of dominant groups. Let's take the use of television in school studies. Poor people, poor families, poor children, spend more time watching television than wealthier children and spend less time doing homework than wealthier children. In almost every domain you see that members of subordinate groups engage in self-harming behaviors to a greater degree that dominants groups. Another example is criminal behavior and homicide. The most prevalent reason why young males who are members of subordinate groups are killed is because of violence at the hands of other poor males. The homicide rates are higher among poor males than among wealthy males. There are these cooperative behaviors among subordinate groups... These are examples of what we call behavioral asymmetry.

**AR:** But don't you think the economic and historical forces play a stronger role in that? Even in the case of television, because it is hard for poor people afford other activities for their children. They are at home because most of the time parents work very far away from their homes and take longer to return home to be with their kids. How can they afford, for example, ballet classes, language courses - extra-curriculum activities that wealthy families usually ca afford for their children?

**JS:** There is no question that people are constrained in the ways you mentioned, because of those reasons you provide. That does not mean that poor people are completely without agency, that they don't have control over their own lives. To the extent to which they do have agency, they often use that agency to engage in self-destructive behaviors.

**AR:** But take the case of the Netherlands, for example. They closed the last prison there due to a lack of prisoners. They have a very good economic environment. There is no criminal behavior there, or at least the criminality rates are very low.

JS: Let's take the incarceration rates. Part of it is due to discrimination, but part of it is due to higher levels of criminality among poor people, right? It is not just that they are discriminated against, that they are over-represented in the criminal system. They also engage in higher levels of criminal behaviors, but those higher levels of criminal behaviors are not completely exogenous; they are due to the fact that their lives are much harder. There is this constant feedback mechanism operating among personal behavior, situations of discrimination, and scarcity, and these forces feed into one another and they become a self-reinforcing cycle. It is important to keep in mind that the higher levels of criminality among poor people are not exogenous, they are endogenous behaviors. I am dedicated to trying to understand the mechanisms and the relationships between them that work to maintain the system. At a meta-level, I argue that there is an interaction or feedback between at least three levels: system levels, organizational behaviors, and the behaviors of individuals, and how they feed into one another.

**AR:** Sometimes you sound to me so negative, you know, like you don't have hope in humanity, that we are not going to be able to change this scenario.

**JS**: It is only because I've been paying attention to reading history and paying attention to history gives me that orientation. So, I mean, in many ways the emerging fascism in Western and Eastern Europe is an example of history returning and just changing form, but still not quite going away.

AR: Sometimes life can be better for some people, but for others, it looks like it will never be better... [reflection pause]

# Epistemological Highlights: Some Thoughts on Gender Relations and Feminism<sup>9</sup>

AR: In an interview in Chile (Carvacho, 2015) you said, "If you are interested in making progress in the social sciences it is really critically important that you try not to allow your own desires for social change or social equality" to interfere with research. But when the researcher poses the questions and affirmatives, and not the participant per se, I mean, when the participant takes the SDO scale that was constructed by the researcher, aren't the possibilities to control bias greater than if it was the participant that could make the questions they think are important? I mean, once we create the questions, aren't we already putting our bias in it?

**JS:** That's true. We can never be absolutely unbiased or neutral. By the very kinds of questions you ask of the world, is a function of who you are, a particular orientation. But again, the ideal is to try to ask questions as neutral as possible, interpret data in as neutral a fashion as possible, so that your political predispositions and biases don't affect the kind of work that you do. That's the goal. It is not absolutely achievable, but something you should strive for. Which is why, as an analyst, I try not to get involved in political activism at all, neither right nor left. Because if I commit to a particular political position, I will have a predisposition to interpret my understanding of the world in terms of which is compatible with my a priori policy positions. I want my scientific thinking to be divorced from what I'd like to see as much as possible. But that's a goal; it is not completely achievable. This is my personal view, and not everybody agrees with it. But I don't think it is possible to be an activist and a good, objective social scientist at the same time. I think these goals work at cross purposes to one another. For instance, let's take the issue of gender equality or gender egalitarianism. If you are actively involved in political movements to get rid of all possible differences in the way men and women are treated, and the kinds of jobs they have, then your political goal to wipe out any difference in occupation is built on the assumption that men and women are the same. Otherwise, it wouldn't make much sense to expect men and women to have the same behaviors if they were inherently different. But, by coming up with that policy position, you are assuming that there are no differences between men and women. That's an example of what I mean by prior political commitments constraining the kinds of questions you would ask or solutions you would find. That's why it is important not to become too committed to a particular political policy.

**AR:** Well, from my point of view they are very necessary... How about feminism, all the changes feminists propelled in society?

**JS:** Depends what you mean by feminism and how you interpret that. If you mean by feminism not putting any artificial barrier in the way men and women do whatever they would like to do, taking the job they would like to have, then I have no problem with that. But if by feminism...

you mean that men, for example, would not be permitted to show sexual interest in women in the workplace because it would be considered hostile work then I might have a problem with a feminist perspective. For example, if a man were to make a comment to a woman about how nice she looked, or that she had a nice dress on, that would be considered oppressive by many feminists, and that would demand men to go against something that they are predisposed to do, which is to be sexual interested in women. We have to try to first understand what men and women are about, before making law and legislating behaviors between the two sexes. I reject the kind of feminism that assumes there is no difference between men and women, because I think there are differences. That doesn't mean men should be treated better than women, just that the sexes are different, they have different goals, slightly different behavioral predispositions qualities.

AR: As you know I've been studying gender relations for quite a long time from a critical social psychology perspective, basing many of my research questions on the Theory of Social Representation. With some exceptions, this theory doesn't place violence and power relations at its center of analysis. Two of the reasons I decided to come to Harvard and be mentored by you were: (a) your social theory is very concerned with issues related to violence and dominance and (b) you wrote that the theory of Legitimizing Myths (LMs)<sup>10</sup> – one theoretical aspect of the SDT – owes much to Moscovici's notion of "social representations" (Sidanius & Pratto, 1999, p. 45), among others. How is the notion of social representation similar to the Legitimizing Myths theory, and in which aspects do they differ?

set of assumptions that people make in negotiating with social life and with the world in general. They are the prisms you look thru in trying to interpret the nature of social reality blinders and make sense of the social world. I am interested in ideology as a tool that is used by social systems to create and maintain social hierarchical order and the myths and ideologies that people develop have to be consistent with this push-pull, HE [Hierarchy-enhancing] vs. HA [Hierarchy-attenuating]" kind of battle going on all the time. In that sense, it is different. There is always this dynamic going on in society, in advanced societies, open societies, between these two sets of forces. In traditional societies, in small tribes, there isn't the same degree of tension between the two forces of the human soul, because there is very little change in the sets of relationships between young people and old people, people from the in-group or out-group, between men and women, there is a kind of static relation among all these forces. In our society, now that people are bombarded with different perspectives, different ideas, different ideologies, this yin-yang, push-pull, HE vs. HA kind of duality is more evident.

**AR:** You said that feminism is a hierarchy-attenuating legitimizing myth, but not all the time, in all situations.

JS: Let's put it this way. The content of an ideology doesn't have an absolute social function. As an example, we have Martin Luther King's iconic "I have a dream...", speech about people being judged by the content of their character rather than the color of their skin. That ideology can sometimes be used in a hierarchy-enhancing way even though it was first designed to serve in a hierarchy-attenuating fashion way. It depends upon the social context and the circumstances within which the ideology is being recruited. SDT is really context-sensitive. Now, for instance, the belief in color-blindness<sup>12</sup> is used by a lot of conservatives to hinder the progress of racial equality in the United States - when people declare themselves color-blind and not sensitive to racial differences between groups for the purpose of maintaining the hierarchical order between those groups.

**AR:** I struggle to accept the argument in your theory that says women search for the best reproductive men...

JS: Men search for the most reproductive behaviors and women seek for the most successful reproductive behaviors, however, the things men and women do to maximize reproductive fitness are slightly different. Men have a quantitative orientation. I think you all realize by this time in your lives that men are very willing to have random sexual contact. Women are not that keen on that kind of sexuality. And why would men have this promiscuous sexual orientation? Well, it is in their reproductive benefit to do that. Why couldn't women do that? Why would women want to be more restricted in their sexual behavior than the average men? It is very risky. Women can have relatively few offspring in their lives, maybe 20 is about their maximum. Men can have an unlimited number of offspring. I can bring up the example of Genghis Khan. It is supposed that he has six thousand women in his harem. It is postulated, and we have some evidence suggesting that he has been the sire about 10% of the world's population. If he was a poor nobody, a beggar in the street, he would not have had so many survival offspring. That's a very good example of how power influences the number of survival of offspring. What is the point of having power or status? The evolutionary theory suggests that it is to optimize fitness and that power and status are differentially fitness optimizing depending on one's sex.

AR: I think this is a cultural construction, rather than a natural predisposition for men to have so many women. We know so little about sexuality. We don't know, for example, how many men in the world don't have sex or don't want to have sex, or how many women really are crazy for sex. Because sex is taboo! People don't talk about it. It seems to me when we use this kind of argument, we generalize that all men or most men are eager for sex and women are not, that women just want to have babies.

JS: Remember what I said. These statements about women, "women are like that", "men are like that"... They are not one hundred percent accurate. They are trends, tendencies, correlations. Expect for the few differences between men and women related to pregnancy and childbirth, almost all of the psychological differences between men and women are probabilistic and not absolute.

AR: Maybe culture is constructing men to be physically stronger... I don't know. I really like your theory about social dominance, it makes sense to me, that's why I came here [to Harvard University], but I still cannot connect myself with this part of the theory... Let's take the case of sexual orientation. Sexual orientation is not cited among the arbitrary-set system groups listed by you (Pratto, Sidanius, & Levin, 2006, p. 273; Sidanius & Pratto, 2012, p. 33). Where does sexual orientation fit into the SDT?

**JS:** That is really a very good question, and the answer to that is really unknown. We know that a certain proportion of each generation is homosexual, about 10% of any population is gay. And the number of gay men tend to be larger than the number of gay women.

AR: You mean identified as...

JS: Yes, that we can have evidence of, okay? The first question is why are there more gay men than there are gay women? Second, what is the function of being gay in the first place? How does it benefit the individual not to have offspring? We don't have good answers for that. It is not the case, Adriane, that this theory has the answers to everything. There are a number of areas where we still are struggling to try to understand, and one of the things we are struggling to understand is homosexuality.

AR: I understand... it is an epistemological issue... Maybe there are more lesbians than the statistics indicate. In our culture, lesbians tend to be more discriminated against

than gay men. [Pause] In the same interview [I mentioned before], you said you have lost friends for many years over this theory you "developed of taking an evolutionary perspective that is so unpopular on the left" (sic). Dialogue between the right and the left is not always easy, I agree with you. We can say the same about different epistemologies in psychology. Though I see your theory as a critical perspective, like the Theory of Social Representations (TSR), unlike the TSR, I consider you to base your research projects in a positivist epistemology. Do you think social psychologists with different perspectives can construct research projects together? If yes, what suggestions could you make in that direction?

JS: I don't think it is going to be easy at all to have social scientists work together who have different epistemologies. It is too difficult to do. First of all, because they don't agree in what constitutes evidence. Unless you came to an agreement as to what constitutes acceptable evidence, you cannot possibly pose the same questions together and come out with meaningful results. I think qualitative research is useful in posing certain questions to the world, but it is not very useful in terms of hypothesis confirming research, but it is very useful in terms of hypothesis generation. A good example of that is Sigmund Freud's work. He came up with these elaborate theories based on his interactions with his patients. He never wanted to experiment, and he wasn't working within a positivist framework, but he produced some very rich and fertile ideas, just by intuiting them. The same thing with Darwin who developed the evolutionary perspective in animal development, but he never attempted experiments, he didn't perform any statistical analyses, yet he developed an idea which is one of the most profound scientific discoveries of our age, which is the theory of evolution by natural selection. One mistake that is very common when people think of Evolutionary Psychology... is that these [sexual] behaviors were adapted for the environment of evolutionary adeptness for the hunter-gatherer society as we were living in small troops, not in clan systems or state systems. This is a psychology of the small troop, it is not necessarily adapted to the Modern age, computers and birth control pills, and lots of resources. This is really based upon small groups of individuals living in small troops. That's the kind of environment that this psychology was adapted to, not adapted to the Modern world. If we live in a Modern world long enough, a couple of hundred thousand years, then we might develop different psychologies, if we survive long enough. But our psychology is designed to operate in much smaller groups than we have now.

AR: Yes... we do have different epistemologies...

JS: You and I? Yeah, we do...

**AR:** But still we are working together...

**JS:** One of the things I thought would've been good is to become multilingual or multiparadigmatic, so that you could work with qualitative analysis when it is useful and be trained to work with positivist methodologies, and you could switch back and forth depending upon the scientific questions you are interested in exploring. So that, as far I can see it, is your challenge, to learn as much as you can about how positivists do their work and take what is useful from positivism for your own purposes.

**AR:** I agree with you. Even for better understanding the questions I make, and to critique them ... because sometimes we criticize positivism without knowing it very well. It has been a real challenge for me to be here.

## Changes in Society and the "Future" of the Hierarchies

AR: We are witnessing a dramatic change in parent-child relationships regarding authority. Some psychologists and educators have been alerting of an "inversion of roles", where the child dominates the parent. There is this great article from a Brazilian psychoanalyst, Mario Rossi Monti (2008), entitled "Narcissistic contract and the clinic of the void", in which he argues that in Western societies, children have truly become "[Their] Majesty, the Baby". In your social model, the SDT, you attempt to identify the various mechanisms that produce and maintain some group-based social hierarchies. Those hierarchies consist of interrelated stratification systems: an age system, a gender system, and an arbitrary-set system<sup>13</sup>. How are these systems interconnected in the production of "[Their] Majesty, the Baby"?

JS: That's an interesting question. I have never really thought about that. I couldn't give you an answer to that interesting question because I haven't thought about that at all. It is not obvious to me what social dominance theory would have to say about that, because within my model children are disenfranchised before they reach adolescent-hood or the age of decision. There are ceremonies in many countries which separate child status from mature, adult status. In Judaism, it is the Bar-mitzvah. In many African cultures, it is ritual of circumcision. But from the social dominance perspective, children are really treated as less valuable in some sense and certainly not to be decision-makers of important things because they are children. It is a very traditional way of looking at childhood and adulthood. The difference between the arbitrary system and the gender system is that in the age system, if one lives long enough, you get to play every role in the hierarchy.

AR: In Brazil, Catholics are still the majority, [...] but many families don't celebrate First [Holy] communion anymore... and it is tough to educate adolescents nowadays, because there are no boundaries between parents and their children. It is never easy, but with the new technologies is becoming harder.

**JS:** Sexual identity is becoming very complicated as well. Young people often don't want to be referred to by the pronouns he, or she, but want to be referred to by the plural they or we. That breakdown in communication makes it a little difficult for people of my generation to interact with the new generation and their ideas of identity.

AR: Going back to Genghis Khan... You mentioned in another moment that if Genghis Khan was a poor man, he wouldn't have had so many survival offspring... [...] What will happen if we develop into a society where women make more money and have better jobs than men? Something we are witnessing ...

JS: In the post-industrial world... This is happening. Evolutionary Psychology assumes that men and women are equally interested in producing survivable offspring for the next generation. The difference between them is that they do it in slightly different ways. For women, it is important to select the high status, high provisioning male, so that she can take care of her offspring: feed them, clothe them, house them, give them medication, and provide them with access to the resources they need to survive until they reach reproductive adulthood. She will concentrate her efforts on...

**AR:** But doesn't that happen because we were educated since we were little to believe in that? Instead of thinking that this is genetic, can't it be something cultural?

JS: The mistake you are making is defining this distinction between culture and inheritance, or genetics and culture. They are intertwined into one another. You can't separate them out from one another. You have to speak about them as an interactive whole. For instance, if you take

something like African Americans in the North. Why do African Americans dominate in sports, certain kinds of sports, like football or basketball? They constitute 85 to 95% of professional basketball players. We argue that this is both a genetic and a cultural product intertwined with one another. It is not purely genetic, nor purely cultural.

**AR:** It sounds to me like the genetics are more powerful than culture according to the SDT...

JS: That would be a mistake also. They are equally important distinctions. To finish my example, one of the reasons why there is this difference between White and Black athletes has to do with the cultural institution of slavery and the Middle Passage<sup>14</sup> from West Africa to the New World: South America and North America. The mortality rate of people during that transition to the new world was horrible. Between 33 and 55% of people died in the Middle Passage. And people who didn't have resistance to European diseases such as syphilis died, as well as those who had very high stress levels, so the group of people who landed and disembarked in Brazil wasn't a representative sample of the people who were aboard the slave ship in West Africa. The people who survived were the largest, the healthiest. So, is that genetics or is that culture? It is both, because slavery is a cultural institution that produced genetic effects, and those genetic effects had an effect upon culture again. Because given the fact that African-Americans are so good at basketball, people culturally expect them to be good at certain kinds of sports, which reinforces the stereotype that Blacks are good at sports. There is a constant feedback loop between genetics and culture. The very sport itself is a genetic-cultural product.

## The Media... (Brazilian) Politics... and Future Research Directions

**AR:** I believe that in producing culture and reproducing racism, the media has an important role. You opened the first chapter of the SDT book with a quotation from the New York Times. To the best of my knowledge, you don't have any work focusing on media. Why? How do you understand the role of media in reinforcing social dominance, racism, and gender discrimination?

JS: We didn't have time to go through the media at the time. We made mild allusions to it. In the second edition of the book I will probably be spending a little more time on the media, but my position on the effects of media on oppression is probably very similar to the Marxist perspective of cultural production. The media is an instrument to reinforce the ideology of domination, to brainwash, if you will, or to inculcate the notion that the people at the top deserve to be at the top, and the people at the bottom deserve to be at the bottom. The media is a conduit through which those messages are transferred, but the media is not monolithic. There is also a left-wing media which criticizes and questions the assumptions of the right-wing media. There's Fox News on one hand and MSNBC on the other constantly battling with each other. There are numerous discourses affecting the dynamics of these yin-yang, HE vs, HA relationships. I'd like to emphasize that Social Dominance Theory is, or should be, paying much more attention to the dynamic interplay between HE vs. HA forces. It is not static, at least in Modern societies.

AR: I've been very interested in media for a long time. My studies have been showing that media is a powerful source that changes the way people think. For the Brazilian press, I can say they create their news content basically from two sources: BBC and Reuters, and small media sources copy the content of the Brazilian mega media sources.

This means that what people think about the new male contraceptive (the object of my study at Harvard University) came from those two sources. It is scary, because what we think about it is based on what they think about it.

**JS:** Yeah, which is why a lot of governments try to have control over the media, so that people aren't influenced by foreign powers.

AR: You've been researching attitudes and behaviors in an impressive number of countries. You haven't developed any study with the Brazilian population. As far as I remember, the only Brazilian author you cite in the SDT book is Salvador Sandoval (1991) (Sidanius & Pratto, 1999, p. 186), a political scientist, to exemplify "differential tracking" (p.186). Why haven't you developed any research in Brazil in collaboration with Brazilian researchers yet?

JS: Just for practical reasons. I used a lot of resources in terms of citing people, like Fry and others on the Brazilian case. But I do have a project now which is going to be using, in the long run, Brazilian data. I am looking at ethnic, racial, and national identity in Latin America. We will be starting with three countries: the Dominican Republic and Colombia, and we will be comparing these to the United States. This is simply a pilot study. If we get funded, we are going to have a much larger study across all 33 countries in Latin America, including Brazil. So, it is coming!

AR: As you know, an extreme right-wing candidate and "former army captain who has praised Brazil's 1964-1985 dictatorship and vowed a brutal crackdown on crime and graft" (CNBC, 2018) won the election. The President has been compared to the U.S. President, Donald Trump, and sometimes considered worse than him. According to Times, "He has a long history of invective against gays, racial minorities and women" (Sandy, 2018). How could SDT help social scientists understand the acquiescence of a large part of the world population to candidates who have a discourse against minorities, including sexual minorities (as in Brazil) and immigrants (in the USA and in some European countries)?

JS: The answer to that is that we will argue that there is always a constant, certain proportion of the population who are social dominance oriented, with high scores using SDO and other similar kinds of instruments. The potential is always there. It is a question of whether or not those forces get expressed within public discourses and policies. You can think of the period at the end of the second World War and the defeat of fascism as a period of liberal, left-wing insurgency, but now that left-wing insurgency is being balanced down and over-taken by these hierarchy-enhancing tendencies that were always there. It is a part of the constant feature of the human political psychology. It is a question of what activates it. We can see that the recent phenomena, immigration across borders, has simply stimulated that latent, and already existing hierarchy-enhancing set of forces. Fascism will never go away. It's part of the human psyche. The potentiality is a constant. It is a question of what kind of circumstances stimulate it and what kind of circumstances make it go to sleep for a while, but it is always there.

### Final remarks

Here, I introduced Professor Sidanius to the Brazilian social psychology community and I also shared with the reader my thoughts and doubts regarding some aspects of the SDT theory. The interview doesn't fully capture the fascination Professor Sidanius instigates within whoever meets him. I truly believe that I have encountered a "classic" figure in social psychology that has to become part of the "hall of fame" in our field.

Because I am resistant to the evolutionary psychology approach due to the frequent misuses of it (e.g., variations and cultural transfer and absorption disregard, aiming to generalizations, eugenic purposes, observational distortion, lack of a critical gender perspective), I had to challenge myself in constructing questions that could show the richness of the thoughts and work of Professor Sidanius without imposing my representations of the theory and theorists. For many years I've been hearing that the American mainstream social psychologist cannot get along professionally with "constructionists" or socio-historical psychologists, and vice-versa. If this argument is indeed correct, we are corrupting a fundamental epistemological assumption of a critical social psychology, that is, it undermines its relational and dialogical approach.

I believe we can and should learn from (and respect) one another's perspectives, and my novel relation with Professor Sidanius proves that it is possible. Even though we don't agree on everything, we don't like every theoretical assumption made by one another, we ought not forget that in social sciences we must be truly committed to keep the conversation going, we must continue inquiring, and that requires openness, flexibility, and, most of all, humility. I am not sure if I am going to be able (or if I wish) to become multilingual or multi-paradigmatic in social psychology, as Professor Sidanius expects of me, but I do know we need to be respectful of different paradigms, to appreciate what they have to offer, and recognize the limitations of each paradigm. Otherwise, we would be reinforcing a position of domination and a univocal way of thinking and engaging with social psychology. And this would not be critical social psychology.

#### **Endnotes**

- Named in honor of William James, the American professor and psychologist, who offered the first psychology course in the United States.
- 2 The authors want to thank Cristina Zubizarreta for the English text revision and comments, and also to Alexa Lipkin for her remarks.
- The SDT was introduced in Brazil in the mid-2000s, particularly through the works of Fernandes, Costa, Camino, and Mendoza (2007) and Fernandes and De Almeida (2008). More recently we found the publication of Barroca e Garcia (2019). It is worth mentioning that, although the authors state that they analyzed, from the perspective of SDT, conceptual issues related to "race", as well as its effects on the hierarchy and maintenance of structures of Brazilian society, we did not identify the use of SDT theoretical constructs (e.g., legitimizing myths, arbitrary-set systems, social dominance orientation) in the analysis of the object of study per se.
- For more information about the SDO Scale see Ho, Sidanius, Kteily, Sheehy-Skeffington et al. (2015). It was adapted in a Portuguese sample (see Giger, Orgambídez-Ramos, Gonçalves, Santos, & Gomes (2015).
- "Black Power was a revolutionary movement that occurred in the 1960s and 1970s. It emphasized racial pride, economic empowerment, and the creation of political and cultural institutions" (The U.S. National Archives and Records Administration, 2018).
- Members of The Black Panther Party for Self-Defense, "founded in 1966 in Oakland, California by college students Huey P. Newton and Bobby Seale. It was a revolutionary organization with an ideology of black nationalism, socialism, and armed self-defense. (...). They provided free breakfast for school children, sickle-cell anaemia testing, legal aid, and adult education". (The U.S. National Archives and Records Administration, 2016).
- Uncle Tom is a Christian character portrayed in the book "Uncle Tom's Cabin" (Stowe, 1889). Tom was a slave beaten to death by his master, because he refused to betray the location of the slaves who have escaped from slavery. But the expression has been used in a pejorative way to refer to a Black person who is benevolent in excess, very obedient, and respectful towards White people. An Uncle Tom kind of person has no pride at all, and s\he doesn't stand for Black people's right.
- A Kapo was a Jewish prisoner living in a concentration camp who supervised other prisoners. "They were responsible for controlling the masses of prisoners and took part in fashioning the perverse rules according to which the camp operated" (Friling, 2014, p. 32).

- 9 To learn more on how the SDT understand gender, see Sidanius, Hudson, Davis, and Bergh (2018).
- LMs are defined "as values, attitudes, beliefs, casual attributions, and ideologies that provide moral and intellectual justification for social practices that either increase, maintain, or decrease levels of social inequality among social groups" (Sidanius & Pratto, 1999, p.104).
- HE LMs are discourses or practices that can enhance social hierarchy by justifying it or reinforcing it. HA LMs can reduce social hierarchy by delegitimizing the HE LMs.
- Verbatim, in the context of the Humanities and Social Sciences, this expression means "color blind" [of someone]. Usually, the expression comes along with the word racism, designating, in this case, the denial of racism, that is, a color-blind person does not understand social inequities by means of racism, but by ideological arguments, such as "The reasons he did not get the job have nothing to do with his color or race. It is because he didn't work hard enough at school"...
- On the arbitrary-set system, see Sidanius and Venigas (2000).
- 14 Forced voyage, by the Atlantic Ocean to the New World, of Africans who were enslaved by the Europeans.

#### References

**Barroca e Garcia**, F. (2019). Raça e identidade nacional brasileira: uma análise sob a perspectiva da teoria da dominância social. *Revista Científica FAESA*, *15*(nspe.), 101-103. Retrieved from http://revista.faesa.br/revista/index.php/Faesa/article/view/527

Carvacho, H. (2015, September 28). *Entrevista com Jim Sidanius* (YouTube). Chile: Centro de Estudios Interculturales e Indígenas. Retrieved from <a href="https://www.youtube.com/watch?v=p55TKR6tIyo">https://www.youtube.com/watch?v=p55TKR6tIyo</a>

**CNBC** (2018, Oct. 7). Brazil right-wing presidential candidate wins vote but runoff likely. *Reuters*, 8:57 PM EDT. Retrieved from <a href="https://www.nbcnews.com/news/world/brazil-right-wing-presidential-candidate-wins-vote-runoff-likely-n917611">https://www.nbcnews.com/news/world/brazil-right-wing-presidential-candidate-wins-vote-runoff-likely-n917611</a>

Fernandes, S. C. & De Almeida, S. S. (2008). Mensuração e análise dos níveis de orientação à dominância social. *Psicologia em Foco*, *I*(1), 1-7.

Fernandes, S., Costa, J. Da, Camino, L., & Mendoza, R. (2007). Valores psicossociais e orientação à dominância social: um estudo acerca do preconceito. *Psicologia: Reflexão e Crítica*, 20(3), 490-498. https://dx.doi.org/10.1590/S0102-79722007000300017

Friling, T. (2014). A Jewish Kapo in Auschwitz: History, Memory, and the Politics of Survival. Waltham, MA: Brandeis University Press.

ISSN 1807-0310 - 17 -

Giger, J., Orgambídez-Ramos, A., Gonçalves, G., Santos, J., & Gomes, A. (2015). Evidências métricas da adaptação da Escala de Dominância Social numa amostra portuguesa. *Avaliação Psicológica*, *14*(1), 143-151. Retrieved from http://pepsic.bvsalud.org/scielo.php?script=sci\_arttext&pid=S1677-04712015000100017&lng=pt&tlng=pt.

Ho, A., Sidanius, J., Kteily, N., Sheehy-Skeffington, J. et al. (2015). The nature of social dominance orientation: Theorizing and measuring preferences for intergroup inequality. *Journal of Personality and Social Psychology*, 109(6), 1003-1028.

Monti, M. R. (2008). Contrato narcisista e clínica do vazio. *Revista Latinoamericana de Psicopatologia Fundamental*, 11(2), 239-253. Retrieved from <a href="https://dx.doi.org/10.1590/S1415-47142008000200006">https://dx.doi.org/10.1590/S1415-47142008000200006</a>

Sandy, M. (2018, Aug.23). Jair Bolsonaro Loves Trump, Hates Gay People and Admires Autocrats. He Could Be Brazil's Next President. *Time, World Brazil*. Brasilia. Retrieved from <a href="http://time.com/5375731/jair-bolsonaro/">http://time.com/5375731/jair-bolsonaro/</a>

Sidanius, J. & Pratto, F. (1999). Social dominance theory. An integration theory of social hierarchy and oppression. Cambridge, UK: Cambridge University Press.

Sidanius, J. & Pratto, F. (2012). Social dominance theory. In P. A. Van Lange, A. W. Kruglanski, & E. T. Higgins(Orgs.), *Handbook of Theories of Social Psychology* (vol. 2, pp. 418-439). New York, NY: Sage.

Sidanius, J. & Venigas, R. C. (2000). Gender and race discrimination: The interactive nature of disadvantage. In S. Oskamp (Ed.), *Reducing Prejudice and Discrimination*. The Claremont Symposium on Applied Social Psychology (pp.47-69). Mahwah, NJ: Lawrence Erlbaum Associates.

Sidanius, J., Hudson, S.T. J., Davis, G., & Bergh, R. (2018). The Theory of Gendered Prejudice: A Social Dominance and Intersectionalist Perspective. In A. Mintz, & L. Terris (Eds.), *The Oxford Handbook of Behavioral Political Science*.

DOI: 10.1093/oxfordhb/9780190634131.013.11

Stowe, H. B. (1889). *Uncle Tom's Cabin: Or, Life Among the Lowly*. Boston; New York: Houghton Mifflin Company.

The National Archives and Records Administration. (2016). *The Black Panther Party*. (Last reviewed on October 18, 2016). Retrieved from <a href="https://www.archives.gov/research/african-americans/black-power/black-panthers">https://www.archives.gov/research/african-americans/black-power/black-panthers</a>

The National Archives and Records Administration. (2018). *Black Power*. Last reviewed on December 11, 2018). Retrieved from <a href="https://www.archives.gov/research/african-americans/black-power">https://www.archives.gov/research/african-americans/black-power</a>

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